COVER PAGE

UNIVERSITÉ DE SHERBROOKE

Étude sur l'évaluation des pairs complétée individuellement vs. publiquement sur des étudiants en techniques administratives

Comparative Study on Private and Public Peer Evaluations on Business Students at the College Level

par

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SUMMARY

Future Business graduates will enter a workplace where they will have to be accountable for their work and will be working in self-managed teams. They may be in situations where they will evaluate and propose new solutions to challenges and may have to work with peers who do not pull their own weight. As such, evaluation skills accompanied by strong communication skills will be crucial for their success.

Peer feedback is a constructive learning tool for students to acquire deep learning, to become more engaged and committed to the task and course. However, when peer evaluations are completed privately and at the end of the term, these benefits are not obtained. In many Business courses, students do not obtain peer feedback promptly. Often, it is the teacher who explains what the peers said in their respective private peer evaluations (private PE). It is therefore difficult for the teacher to relate what happened in the group. Furthermore, there are no exchanges between the team members to explain or clarify points of view.

Completing the peer evaluations (PE) in public can alleviate these points. In a public peer evaluation (public PE), team members openly discuss together each other's contributions and complete one peer evaluation questionnaire together. Peer feedback is hence shared in a timely fashion, and members can discuss and justify their points, which build their confidence. When completed after key milestones in a group-based project, it allows the team to potentially improve its performance.

This masters paper compares two peer evaluations: private and public peer evaluation. Fifty Business students from a Canadian English college participated in the study. It is an ethnically diverse sample comprised of 25 female and 25 male participants, in their first or third year of study in a technical marketing or accounting program.

The research question is: Are there differences between the private PE versus public PE? Specifically, this study investigated the impact of several variables on the ways students reflect on the PE processes after working on two group-based assignments with the same team. The variables considered are gender, academic profiles, and year of study. The analysis covers differences in benefits and drawback identified in each PE, certain beliefs participants may have towards the PEs, PE preferences, impact on grades, and differences in self-assessment.

This comparative case study examined the impact of repeating two different methods of PEs. The repeated measures allowed for a richer examination of the two forms of PEs. Students were randomly placed in small groups to work on two team-based projects with the same group. After the first assignment, each student completed a private PE. They then met with their respective group to complete the public PE. Both PEs were repeated at the end of the term, after the second group-based project.

Various data collection tools were used. Each participant completed two private PE questionnaires and two public PE questionnaires with their teams. An exit survey was given at the end of the experiment. At the end of the term, participants' grades for both team-based assignments and the course were collected. All data was analyzed in Excel.

Overall gender base differences were minimal. Academic profiles offered meaningful differences. Students who had a weak academic profile were at an advantage in the public PE, and students with a strong academic profile were best served with the private PE. Throughout the various PEs, most average and strong students overvalued their self-assessments and their contribution to the team, however, the proportion of weak in academic profile students who undervalued their self-assessment increased from the first round of PEs to the second round of PEs.

The main benefit identified by the participants of the private PE is “honesty”, and the main drawback is the “difficulty to evaluate teammates”. As for the public PE, “feedback obtained” from teammates is the main advantage, while “potential conflict” the was main drawback. Participants found it challenging or unpleasant to write negative comments to justify peer evaluation scores. Positive comments often accompanied negative comments. The comments on the public PE questionnaire were short, demonstrating team consensus. On the private PE questionnaire, participants’ comments were a bit longer and focused on one or two evaluation criteria (quality of the work, attendance, attitude, etc.)

To ensure the success of PE, the use of both forms of PEs may be beneficial. Evaluation is a difficult skill for students to master within the span of one course. Therefore, teachers must clearly explain the evaluation criteria, especially if the work to assess is complex. They should repeat the exercise, when possible for students to perfect the skills. Simplicity in the PE questionnaire will ensure students complete it in full and truthfully.

RÉSUMÉ

Les diplômés en techniques administratives entreront dans un milieu de travail où ils devront rendre compte de leur travail et leur performance. Ils travailleront en équipes autonomes, légèrement supervisée. Ils devront évaluer et proposer de de nouvelles solutions aux défis présentés. Certains travailleront avec des collègues qui ne contribueront pas de façon équitable. Pour bien gérer et performer dans de telles situations, ils auront besoin de fortes habiletés en communication et en évaluation.

L'évaluation des pairs est un outil d'apprentissage constructif permettant aux étudiants d'acquérir un apprentissage approfondi et de s'engager davantage dans leurs travaux. Cependant, lorsque l'évaluation des pairs est complétée en privé et confidentiellement (EP privée) à la fin du trimestre, ces avantages ne sont pas obtenus. Dans de nombreux cours en commerce et en techniques administratives, les étudiants ne reçoivent pas les commentaires de leurs coéquipiers à temps pour améliorer leur contribution et leur attitude dans le groupe. Souvent, c'est à l'enseignant d'expliquer ce que les coéquipiers ont rédigé dans leurs évaluations des pairs privées (EP privée) respectives. Il est donc difficile pour l'enseignant d'expliquer ce qui s'est passé dans le groupe et d'élaborer sur les justifications des coéquipiers. L'EP privée n'offre pas d''échanges entre les membres de l'équipe afin expliquer ou clarifier les points de vue et justification.

L'évaluation des pairs complétée en groupe suite à un consensus peut atténuer ces points négatifs. Dans cette forme d'évaluation des pairs publique (EP publique), les membres de l'équipe discutent ouvertement des contributions de chacun et complètent ensemble le formulaire d'évaluation des pairs. Ils doivent s'entendent sur le contenu et les notes donnés à chacun. Cette (ces) discussion(s), permet(tent) aux membres de l'équipe de présenter leurs points de vue, fournir des explications pour leur contribution et leurs attitudes, et d'obtenir un feedback de leurs pairs. Ce format

offre une opportunité d'améliorer la dynamique de l'équipe pour qu'elle puisse mieux performer lors des travaux suivants.

Ce document de maîtrise compare deux formes d'évaluation des pairs: une évaluation complétée individuellement et confidentiellement (EP privée), contre une évaluation complétée en groupe suite à un consensus (EP publique). Cinquante étudiants en techniques administrative d'un collège d'anglais canadien ont participé à l'étude. Il s'agit d'un échantillon ethniquement diversifié composé de 25 femmes et de 25 hommes. Ils sont dans leur première ou troisième année d'études dans un programme technique en marketing ou en comptabilité.

La question de recherche est la suivante: Existe-t-il des différences entre l'EP privée et l'EP publique? Plus précisément, cette étude analyse l'impact de plusieurs variables sur la façon dont les élèves réfléchissent aux processus d'évaluation par les pairs. Les participants ont complété une EP privée et une EP publique immédiatement après avoir complété le premier travail de groupe. Ils ont répété le même processus après un second travail en groupe avec les mêmes coéquipiers. Le fait de répéter le processus d'évaluation à deux reprises a permis un examen plus riche des deux formes d'évaluation des pairs. Les étudiants ont été placés au hasard en petits groupes pour travailler sur deux projets en équipe avec le même groupe.

Les variables étudiées sont les différences entre les femmes et les hommes, les profils académiques et l'année d'étude. L'analyse couvre les différences entre les variables étudiées, certaines croyances que les participants peuvent avoir envers les évaluations des pairs, leurs préférences, l'impact de chaque forme d'évaluation des pairs sur les notes individuelles, et l'impact sur l'auto évaluation.

Divers outils de collecte de données ont été utilisés. Chaque participant a complété deux questionnaires d'EP privées et deux questionnaires d'EP publiques avec leurs équipes. À la fin du cours, ils ont complété un questionnaire afin de

connaître certaines données démographiques, leurs préférences et certaines croyances face à l'évaluation des pairs. À la fin du trimestre, les notes des participants pour les travaux en équipe et le cours ont été recueillies. Toutes les données ont été analysées dans Excel.

Les différences entre les participantes féminines et les participants masculins étaient minimes. Les profils académiques offrent des différences plus significatives, cependant. Les étudiants avec un faible profil académique étaient avantagés dans l'EP publique ; les étudiant avec un profil académique fort étaient mieux servis par l'EP privée. Tout au long des diverses évaluations des pairs, la plupart des étudiants de profils moyens et forts ont surévalué leurs propre contributions (auto-évaluation), mais les étudiants faibles en profil académique ont très souvent sous-évalué leur contribution.

Les participants ont reconnu que le principale avantage et désavantage de l'EP privée étaient la confidentialité et la difficulté d'évaluer les autres respectivement. En ce qui concerne l'EP publique, le feedback des pairs est le principal avantage. Là aussi, les participants ont trouvé la tâche d'évaluation des pairs comme étant difficile ou désagréable. Il n'est pas plaisant d'écrire des commentaires négatifs pour justifier les notes d'évaluation des pairs. Pour ce, les commentaires positifs accompagnent souvent les commentaires négatifs. Ces commentaires étaient courts, démontrant le consensus de l'équipe. Sur le questionnaire d'EP privée, les commentaires des participants ont été un peu plus long et portaient sur un ou deux critères d'évaluation (qualité du travail, participation, attitude, respect des date de tombée, etc.).

Pour assurer que les étudiants bénéficient pleinement de l'évaluation des pairs, les deux formes d'évaluations peuvent être utilisées en complémentaire. L'habileté à évaluer s'améliore avec le temps. Il est donc important de pratiquer et de répéter l'exercice. Les enseignants doivent expliquer clairement les critères d'évaluation, en particulier si le travail à évaluer est complexe. En terminant, la

simplicité du questionnaire d'évaluation utilisé garantit que les étudiants terminent le questionnaire au complet et honnêtement.

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LIST OF ABBREVIATIONS

AP:	Academic profile
APs:	Academic profiles
PE:	Peer evaluation
PEs:	Peer evaluations
PE score:	Peer evaluation score
Private PE:	Private peer evaluation
Public PE:	Public peer evaluation
SA:	Self-assessment
SAs:	Self-assessments
ZPD:	Zone of proximal development

DEDICATION

To Grandma, for being a positive role model and for your endless love and support. I miss you.

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INTRODUCTION

Many of the world's best innovations are created and managed by teams. When individuals assemble to form a team, expectations and norms will arise. Teams will develop their culture and processes to achieve their goals. Personalities and relationships play an important part on the team's performance as they influence the decisions and the ways of working. All these factors play into the perceptions one has of the team members' contribution and performance to the group-based project.

As Businesses become more complex, they seek candidates who communicate well, work and learn effectively in teams, and who are interdependent (Gardner & Korth, 1998; Ashraf, 2004). Through the use of various communication tools, teams may be in different locations, while working on the same group-based project. According to Yazisi (2004), "self-directed work teams are seen as an important mechanism for dealing with today's complex and rapidly changing Business environment" (p. 110). Therefore, members of a team must find strategies to monitor and improve their teams' performance, and be able to offer and receive feedback.

Common Business practices show that Business people must be accountable and responsible for their actions and decisions, especially in a decentralised working environment that empowers employees. Teams are often self-managed. The result and or the outcome of a group-based project will impact decisions made for possible promotions, pay raises, bonuses, and training requirements. Employees have to establish their position in a team and develop alliances while performing and achieving the goals of the team.

This master's paper first presents the problem statement in the context of North American Technical Business programs. These programs prepare students to work in a diverse, complex, and rapidly changing North American Business environment. An exploration of the existing literature on peer evaluation (PE) completed at the end of the group-based project is presented. It has many benefits for the students and the teacher; however, some of its drawbacks may hinder students' learning and add additional tasks on the teacher. A public peer evaluation (public PE) is proposed as a solution to the problem elaborated in the next chapter. The methodology explains the research design, the sample studied, and the data collection. Quantitative and qualitative findings are presented and analyzed using several variables. The thesis ends with a discussion and conclusions, the limitations of the study and recommendations.

CHAPTER ONE
PROBLEM STATEMENT

Students entering the workforce will be working in teams, with co-workers that may or may not pull their weight. Defending and evaluating one's and others' work is an authentic Business practice. Employees and managers have to regularly communicate and persuade their peers, customers, shareholders, and other members of the community. They also have to defend the quality of their work and their performance at various moments in their day-to-day life or career. Requesting a pay raise, proposing a new method of work, or letting a certain employee go, are examples of Business moments when evaluation skills and communication skills are essential. As teamwork is becoming more and more prevalent in the workplace, mutual accountability and responsibility are required. Furthermore, recent graduates as new employees are often required to prove themselves. Knowing how their peers and others view them and mastering the ability to rectify these perceptions are critical success factors at work.

One of the ways college-level technical and pre-university Business programs prepare students to work in teams is through small team-based projects and the use of collaborative or cooperative learning strategies. Evaluation of a student's contribution to the team-based project is a major challenge (Paswan & Gollakota, 2004). Grades are often awarded on final outcomes and ignore the process or the effort (Ashraf, 2004). One of the reasons for this occurrence is that teachers have limited knowledge of the group's process, effort, dynamic, and individual

contributions. Furthermore, students on a team are often awarded the same grade for the group-based assignment. This strategy may encourage "free riders" that contribute little to the overall assignment considering there are few rewards for their extra efforts (Tu & Lu, 2005). This form of grading also reduces the opportunity for strong in academic profile (AP) students to stand out from the group and thereby to obtain a higher grade for their additional efforts and contributions. Peer evaluation (PE) is one way to rectify this problem and to provide information on students' experiences and contributions to the group process (Chen & Lou, 2004; MacDonald, 2011).

However, PEs completed at the end of the term are often confidential and completed individually, i.e. private. After the group-based assignment, each student completes a questionnaire detailing the group process. This process welcomes similarities and contradictions on each students' contribution to the group-based assignment. According to Tu and Lu (2005), "even though everyone in the team does his or her best, the contribution to the group project is still different from others' because of his or her different background, motivation and intelligence" (p. 198). PEs are often used to modify students' grade for the team-based assignment. Given that PEs occur at the end of the term and are private, most students do not receive their peers' feedback. They do not see the PE scores and comments. If the teacher respects the PE scores, students' individual grades will increase or decrease for the group-based assignment. When the student's grade increases, it is not an issue; students are usually happy, and will most likely not inquire why their grade increased. They assume their contribution to the group exceeded expectations, but may not know why specifically. However, if the individual grade for the group-based project decreases, students may suspect their peers under evaluated them. Sometimes, students will follow up with the teacher.

At this point, the onus is on the teacher to explain the reasons for the student's individual grade change. Students receive peer feedback through a third party, and they are unable to modify the perception of their peers. They may challenge the peer feedback and the PE score. It is up to the teacher to determine the outcome. As well, students are unable to improve their teamwork ability or the team's performance as the course has already ended. Mastery of skills happens with repetition. The improvements may occur in another course, with another team. The challenge is for students to recall the constructive peer feedback obtained through the teacher, and apply it to this new team's culture, norms, and expectations to perform in the team-based assignment. It may or may not be applicable.

For the teacher, communicating the peer feedback effectively may prove challenging considering most of the group process was done outside of class time. Teams most likely do not regularly report issues to the teacher. Teams have to self-regulate. Although they may keep logbooks and minutes detailing their meetings and processes, this strategy is time-consuming for teachers to evaluate (Tu & Lu, 2005). Most Business teachers grade the outcome of the team-based project and not the process.

The public peer evaluation is a potential solution (public PE) to address these challenges. Together with their teammates, students openly discuss each other's contributions to the group-based assignment. After discussion(s), they reach a consensus regarding each member's contributions. Over or under contributors must justify why they deserve a different PE score. Students are therefore accountable to each other for their work and the success of the team.

This research paper presents the findings of a comparative study between the private PE and the public PE. It studies the several impacts, differences, and similarities between both PEs. Differences and similarities between genders, academic profiles, and year of study variables are reported. Self-assessment

throughout the PEs are analyzed to indicate the impact of the various PEs. The participants worked with the same group on two high stake group-based assignments on the same course.

CHAPTER TWO
CONCEPTUAL FRAMEWORK

This chapter presents the conceptual framework for the study. It will focus on social development, moral judgment, and level of thinking theories. Constructivism and social constructivist theories are the underlining approach and educational values in this research study. Resnick (1997) as cited by Richardson (2003 p. 1924) defines constructivism as "a theory of learning or meaning making, that individuals create their own new understandings on the basis of an interaction between what they already know and believe and ideas and knowledge with which they come into contact". Therefore, obtaining peer feedback should help the students improve their contribution to group-based assignments, thereby improving the team's performance.

1. SOCIAL DEVELOPMENT THEORIES

According to Bronfenbrenner's ecological system theory (1994), the classroom forms a microsystem that influences students' behaviours. As well, the students' macro system can affect their behaviours in their group. The population studied is developing their last cognitive functions and may be experiencing external stressors such as work, family dynamic or problems, or health issues. These stressors

impact the students' ability to operate in their teams effectively and to contribute to group-based assignments, thereby impacting their peer evaluation (PE).

As well, Vygotsky's developmental psychology theory (2012) explains that development occurs through gradual accumulation of information and development. The college student population of late teenagers to young adults is in this phase. Student progress at their own pace. Therefore, a team may consist of students with cognitive and moral values that are much more developed compared to their peers. The PE will then differ. Higher cognitive functions are also developed through experience. By the third year of college, students experienced many group-based projects and possibly many PEs. These experiences influence their decisions and perceptions of team-based projects and PEs.

2. MORAL JUDGMENT THEORIES

Students are sometimes faced with an ethical dilemma in their PEs. They believe they must choose between reporting the poor performance of a teammate with the risk of this teammate failing the group-based assignment, or being loyal to a friend. As students are developing these cognitive functions, they are also going through the various stages of ethical development. According to Perry's scheme of intellectual and ethical development theory (1994), students will go through four main stages: dualism, relativism, commitment, and empathy. Relationships and friendships among the team members may influence the PEs. Although the literature presents contradictions on this point, theories discussed as of now support the idea that friendship and relationships will affect PE. Malone (2011) and Topping (2009) refer to the prisoner dilemma and confirms that friends will score higher than rivals. It is in sync with practices at the workplace, where relationships among employees influence Business decisions.

College level students are also developing their emotional intelligence. According to Daniel Goldman (2005), individuals with a high emotional intelligence are aware of their feelings and emotions and can sense and manage the emotions of others. Emotions influence many of the daily decisions taken. In teams, students develop a sense of belonging and respect for one another other. Empathy is a crucial element of emotional intelligence. However, to be empathetic, one needs to be able to focus on others. Late teenagers are coming out of the "world revolves around me" stage of their development. They may be uncomfortable to give negative feedback. Emerging adults are young adults between 18 and 25 years old. They are ending puberty, becoming independent and widely experiencing. They are overwhelmed with emotions and new experiences.

Furthermore, Baxter-Magolda's epistemological reflection model (Magolda, 1992) says learners move from an absolute knowing stage to transitional knowing, independent knowing, and ends with contextual knowing. At each stage, peers play different roles from sharing and explaining material to providing active exchanges, to sharing views, and finally by contributing with quality elements. Although the students in this population are at different learning level, a student who reached advanced stages will appear to contribute more than a student in the absolute knowing stage.

Lastly, students construct their learning individually and with their peers. Therefore, the zone of proximal development (ZPD) is a factor to consider in PEs. Vygotsky's (1978) as cited by Hartland (2010, p. 265) defines ZPD as "the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance or in collaboration with more capable peers". When a group of students has a limited ZPD, it may either encourage mentorship-like relationship in a group or create tensions. Teams with members of similar ZPD may experience less tension.

3. LEVEL OF THINKING THEORIES

Peer evaluations require students to climb Bloom's Taxonomy hierarchy (Bloom, 2004). Students are asked first to recognize behaviours that contribute (or not) to the success of the team and its work. They must then analyze and critique these behaviours, and express them verbally and in writing. Lastly, they are asked to evaluate the contribution of their peers and pose a judgment that will have consequences on the team. Students have to synthesize the multiple behaviours and experiences to pose a judgment. These are skills recently acquired by the student population in this study. As students are evaluating, they are considering multiple criteria: relationships and friendships, judgment from their peers, pressures and norms established in the team, etc.

The last cognitive skills described in Bloom's Taxonomy are developing at the same time as social and self-esteem needs and emotional intelligence. According to Maslow's hierarchy of needs theory (Maslow, 1943), the population considered in this study is highly preoccupied with their social needs. This category includes the need to conform, to belong, and to build relationships and friendships. As well, they are concerned with self-esteem needs, i.e. the desire to obtain respect from others and a status in the group, achieve personal goals and self-confidence.

CHAPTER THREE
LITERATURE REVIEW

This third chapter reviews existing educational research on peer evaluations (PEs) and groups. It will present the benefits and the drawbacks of PEs, PE criteria for success in a group-based assignment, and existing research on PE. It ends with the presentation of the research question.

1. BENEFITS AND DRAWBACKS OF PEER EVALUATIONS

The literature denotes multiple benefits for students to part take in PE. According to MacDonald (2011), students became more engaged and committed to the group-based assignment. The research shows that feedback from the evaluation improves learning. Evaluators also benefit as it reinforces their learning, and PEs support both independent learners and students who learn in-group or in collaborative form. Vickerman (2009) demonstrated that PEs provide valuable insights to the students' self-assessment (SA). It allows students to develop their judgment abilities and sense of responsibility. Most importantly, PEs encourage deep learning rather than surface learning (Vickerman, 2009; MacDonald, 2011).

Research shows that PEs offer students an opportunity to reflect on the exercise constructively and provide structured feedback. According to Pockock, Sanders, and Bundy (2009), most students feel positive about the experience and claim they learned how to work more efficiently in a team. Chen and Lou (2004) say that PEs improve the accuracy of the evaluation process because students are involved and see behaviours that are hidden to teachers. The consensus in the literature is that students find the process of discussing and justifying their contribution marks valuable in enabling them to build confidence, argument rationally, and develop negotiation skills.As for drawbacks of PEs, students who do not learn well independently, prefer teacher assessments to PEs. Vickerman (2009) demonstrated that students tend to slightly over mark or under mark their peers in comparison to teacher's evaluations. Research shows that grading assignments is a challenge for experienced teachers, it may represent true difficulties for students who are in the process of learning and mastering the concepts while making their team work efficiently.

Furthermore, students with opposing views to the group found it difficult to express it and preferred teachers to intervene (Vickerman, 2009). Boud and Falchicov (1998) as quoted by MacDonald (2011) say students analyze the contribution of their peers and themselves based on the result of the assignment and their peer' behaviours and attitudes. Therefore, not every PE is based on the same criteria. The literature reveals that students find it easier to evaluate peers on technical or specific tasks, instead of summative assessments at the end of a term.

As well, the literature demonstrates that in private PEs, quieter students and "free riders" were at a disadvantage. Students are uncomfortable with the weight of the responsibility of PEs (MacDonald, 2011). Criticizing a friend is risky and arduous (Tu & Lu, 2005). In Pockock, Sanders, and Bundy's (2009) study, students completed their PEs with their groups. They reported that students felt apprehensive

about confronting their peers regarding their poor contribution to the group-based assignments. Students were also anxious about receiving feedback on their performance. This research also concluded that some students assigned a lower score to peer members who poorly contributed as "punishment." In a group setting, students felt pressured to agree to "reach an agreement on allocating higher marks to those who did not deserve them" (Pockock, Sanders & Bundy, 2009, p.5).

Lastly, reliability and validity in private PE are issued raised by a few researchers (Ammons & Brooks, 2011; Paswan & Gollakota, 2004; MacDonald, 2011; Vickerman, 2009). The peer assessment and SA may sometimes differ from teachers' evaluations. These issues persist because teachers evaluated students based on their experiences and in a context that differs from students. A common misconception in the literature is that students tell the truth in their PEs. However, students may be biased in the evaluation to boost their personal contribution (Paswan & Gollakota, 2004; Tu & Lu, 2005), hence the importance of clear evaluation criteria that both students and teachers understand.

2. PEER EVALUATION CRITERIA FOR SUCCESS

For PEs to be successful and to ensure the students enjoy the benefits mentioned earlier, teachers must explain, train, and guide students through the process. Vickerman (2009) stressed the importance of timing the feedback with the assignments. PEs given at the end of the term, do not allow the students to incorporate this feedback in their current group, course, or term.

There are no universal and standardised form or questionnaire for the PE and the literature presents a wide variety of them. Teachers often create and personalise these forms to their course. Therefore, it is crucial to train students on the PE criteria and on how to use them (Vickerman, 2009; MacDonald, 2011). According to Tu and

Lu (2005) the process must be simple and encourage students to tell the truth and write meaningful comments. Based on these meaningful comments, the teacher can accurately judge them and decide how to modify or not the individual grade (Chen & Lou, 2004).

Students are not automatically prepared to work in teams effectively and manage the inconvenience of a group-based project (Kaenzig, Anderson, Hyatt & Griffin. 2006; Ashraf, 2004; MacDonald, 2011). Therefore, it is important for teachers to define what constitutes effective group work and poor contribution to group work.

3. GENDER DIFFERENCES

According to Kaenzig and colleagues (2006, 2007), female students in group settings are more concerned with building relationships and the welfare of others, require recognition and encouragement and communicate more. Male students are driven by issues of separation and are more assertive. As well, male students who receive more attention in the class, tend to score higher on peer evaluations because they are viewed positively in the class (Ammons & Brooks, 2011) Furthermore, female students dislike depending on others for their grades.

However, in competitive tasks, Kaenzig (2007) did not notice a difference between the genders. Furthermore, gender balanced groups are less likely to stereotype female students in traditional gender roles. In the same lines, Sormunen-Jones and colleagues (2000) demonstrated that females did not necessarily work better in single gender groups. In self-assessments, female students tend to self-score lower than male students (Kaenzig, 2007; MacDonald; 2011, Topping, 2009). This process also stressed female students more than male students (Kaenzig, 2007).

4. EXISTING STUDIES ON PEER EVALUATIONS

Vickerman (2009) investigated the value of formative PEs, as a way to assess learning. His sample consisted of 90 second-year Britain undergrad students, mostly aged between 19 to 25 years old, where 60% of the sample was female. The importance of peer evaluations and self-assessments was shown in MacDonald's (2011) study of 40 undergraduate students in a nursing program. Tu and Lu's (2005) research acknowledges the degree to which the level of students' truthfulness in their PEs influenced their individual contributions in the teamwork. To do so, they collected students' logs on their teamwork as well as used questionnaires to gather their reflections and opinions. Chen and Lou (2004) explored students' motivational factors, through expectancy theory, to participate in the PE process for group projects, with a sample of 122 second and third year Business undergraduate students

Pockock, Sanders, and Bundy (2009) completed a longitudinal study of 180 students in medical programs in Britain over three years, on the impact of teamwork on PE. Participants openly discussed and evaluated their peers in public. Students had the opportunity to increase or decrease their peers' grade. For example, if the grade for the group assignment was 78, a peer could assign a PE score of 80 percent, which would lower that individual's student grade (78* 0.80=62.4), or assigned a higher percentage, such as 110, which increased the individual student's grade (78*1.10=85.5). Data was collected using learning journals where students reflected on the PE process, classroom observation by the researchers, focus groups, and student interviews. In that study, teachers intervened in the group when issues were brought to their attention. This current research modeled its methods of data collection of these studies.

5. RESEARCH QUESTIONS

The bulk of the studies reviewed focused on private PEs. In some of the research, students discussed each other's contribution but submitted their PEs individually. No study looked at completing and submitting a PE in a group after reaching a consensus, i.e. a public PE. This research compares the private PE with the public PE. In short, the research questions to be addressed are: 1) Are there differences between the private PE and the public PE? Specially, what is the impact of these PE forms (private vs. public) on grades, student's self-beliefs and ability to self-assess? 2) How did these students respond to the different PE forms differ based on the following variables: gender, academic profile (AP), and student's year of study.

CHAPTER FOUR
METHODOLOGY

This chapter presents the research design for the study. First, the setting describes the educational environment in which the participants came from. The chapter continues with the research design, the procedure for this comparative study, and the various data tools used. The study design is reflective of key findings from the literature review and the conceptual framework.

1. RESEARCH DESIGN

1.1 Setting

This study took place in the Business and Administration Department at a college within the English CEGEP system in Québec, Canada. The student population of this public institution is highly diverse, from various religious and cultural backgrounds with over a dozen different first languages. English is the language of instruction. For some students, English is their second, if not their third

language; some may find that expressing oneself clearly is challenging.

The Business and Administration Department offers two three-year technical programs in Marketing and Accounting. Upon completion, students have the necessary skills to enter the workforce and start their career in Business or become an entrepreneur. About half of the students further their education at the university level.

Students in both programs demonstrate a keen interest in Business overall. Considering the cohorts are small in these programs, by the third year of study, students know each other well. Many developed friendships and have worked together on team-based projects in previous courses. Therefore, they may know each others' attitudes, personalities, strengths, and weaknesses. During their studies, students stay with the same group of approximately 35 students for the duration of the term for all Business related courses. They may be taking up to six courses together. For this study, year one and two were combined for a total of 26 participants, and are considered as juniors. The seniors are the participants in the third and fourth year of study for a total of 24 participants. All seniors are in the Accounting Program.

By their senior year, the marketing students are very comfortable with oral presentations and team-based projects. However, in this sample, all the marketing students are in their first year. Therefore, the number of completed group-based assignments and oral presentation for the Marketing students is less than the senior accounting students.

1.2 Participants

A convenience sample of 50 students was taken from first and third year college students in the fall and winter semesters of 2013-2014. Students from the 3-year technical programs, registered in the International Business and Business

Analysis courses, formed the participants for this research. The age group ranges between 16 and 25 years old. All students have taken, at least, the Introduction to Business as a core course. In both programs, students complete many group-based projects throughout their studies. Therefore, they have some experience of collaborative and cooperative strategies and group-based assignment at the college level. The researcher was their teacher.

The high-stake assessment was similar for both courses. With their group, participants researched a case and presented their findings in a 15-minute oral presentation. The first group-based project was presented in the middle of the term, and the second case was due at the end of the term.

1.3 Type of Research

This research was a comparative case study that examined the impact of repeating two different methods of peer evaluation (PE): private PEs and public PEs. The repeated measures allowed for a richer examination of the two methods.

1.4 Procedure

In the first week of class, the teacher presented the research project to students, explained the course, and stressed how teacher and students would determine the grades for the group-based assignments. The first task for students was to read the course outline and write comments regarding their expectations and concerns. This activity provided an opportunity to best manage students' concerns regarding the course and the study. No comments regarding the study were made at this moment and during the study itself.

The group-based project was divided into two graded milestones, each worth 15% of the course's grade. Although some time in class was allocated to work on

group-based assignment and to discuss it with the teacher, the bulk of the work was completed outside of class time. All members of the team were accountable and responsible for the completion and the presentation of the team-based project.

1.4.1 Group Formation and Composition of the Group

In the first month of class, groups of three to four students were formed with the students registered in the research/teacher's section for a total of 13 groups. According to Ashraf (2004), when students make their groups, strong in academic profile (AP) students tend to team up with other strong in AP students; leaving the weaker and the average students to form groups among themselves. It quite often leads to weaker in AP students forming groups together. According to Sormunen-Jones and colleagues (2000), teacher-formed groups score higher than a student-formed group on group-based assignments. For these reasons, the research/teacher randomly formed the groups.

Four independent variables are considered in the analysis of the team's composition: gender, the program of study, academic profiles, and year of study. Appendix H shows three tables breaking down the 13 groups according to these variables. There are three meaningful patterns regarding the AP and the zone of proximal development (ZPD). In this sample, groups 8, 9, and 12 had very limited ZPD. The disparity between the number of strong and weak in AP students was great. It might have created tensions or mentorship-relationships in the group. Groups 3, 7, 10 had a higher ZPD. Students in these groups were closer in AP. Lastly, the remaining groups had mixed ZPD, as they had various AP.

1.4.2 Sequence of Peer Evaluations

Students completed their first private PE after the first group-based assignment. This private PE is worth one percent of the final course grade and was

completed in class. After submitting their private PE, with their group, students completed their first public PE. Thirty minutes in class was allocated to this group discussion. Considering that not all groups were able to complete the tasks within the class, some teams finished it outside of this class time. Once all members signed the public PE, each member received two marks.

This first formative private and public PE provided feedback to the students on how their teammates viewed their contributions to the group term projects. It familiarised students with both styles of PEs. Formative peer assessments, according to Vickerman (2011), engages students in the whole process of development in learning and in-group interaction, while improving performance and gaining insight into the technicalities of the task. Lastly, this is a "wake-up call" for students who received a score that differs from their expectations. It is a chance to modify one's behaviour and attitude during the term.

After the second group assignment, the process was repeated. The last day of class was reserved for both PEs. First, each student completed a private PE and submitted it to the researcher/teacher. In the last hour of the class, with their team, they finished the second public PE. Once again each member signed the public PE to confirm they agreed with the PE score and peer feedback.

1.5 Data Collection

This study used questionnaires as the primary data collection instrument. Such a method is consistent with those used by other studies that have investigated the impacts of PEs; e.g., Paswan & Gollakota (2004), Vickerman (2009), McDonald (2011), Pockock, Sanders, and Bundy (2009), and Tu and Lu (2005). Additionally, according to Gay, Mills and Airasian (2012), "survey research determines and reports the way things are; it involves collecting numerical data to test hypotheses or answer questions about the current status of the subject of study" (p. 9). One of the major

drawbacks of using questionnaires is their low rate of returns of completions (Gay, et al., 2012). To alleviate this, the short questionnaire was distributed and completed during class time, when possible.

1.5.1 Peer Evaluations Questionnaires

Both PE forms were in the shape of a questionnaire. Refer to Appendix A for the private PE and Appendix B for the public PE. The literature review on the most challenging issues in group-work identified five items: attendance and punctuality, meaningfulness of the contribution, meeting deadlines, quality of the work, and attitude. They were explained in class, and are defined on the PE forms.

As part of their reflection, participants first evaluated their peers qualitatively on each of the criteria as mentioned earlier. This table allowed for an identification of each others' strengths and weaknesses and compared them. The second page presented instructions on how to allocate an overall quantitative score for each member. For example, for a team of four students, 400 points were awarded to the team. If each member contributed similarly, they were awarded 100 points each. However, if one member over or under performed, the PE score may vary above or under 100 point. The sum of each member's PE score must equal 400. All points must be used. On the last page, the student justified the PE score with written comments on the evaluation criteria.

The public PE was the same as the private PE. The team was responsible for submitting only one copy, as opposed to the private PE, where students returned their completed questionnaire confidentially to the teacher. To ensure each team member is in agreement with the score and the comments, on the last page, each student signed it.

1.5.2 Participant's Grade on Group-Based Assignments

The researcher/teacher had access to the student's grades. After opening the consent forms, only the grades from the participants were tabulated and analyzed in this study. The grades for each group assessment, individual participation, quiz and exam grades were considered.

1.5.3 Exit Survey

After completing the second public PE, students received an exit survey. See Appendix D for the exit survey. Students had to complete it individually in the last class. This survey gathered data on their program of study, PE preferences, drawback and advantages for both PEs, and their perceptions. The researcher's assistant collected these questionnaires.

2. RESEARCH ETHICS APPROVAL

The research proposal was sent to Université de Sherbrooke, and Dawson College's Research and Ethics Board for approval. The various parties approved the study. See Appendix E, F, and G for the approval letters from the Dawson Research Ethics Board and the research supervisor.

On the fourth week of the course, the teacher asked for the consent of students to participate in this study. For minor students, parents or legal guardian had to provide consent. See Appendix C for the consent form. Participation was voluntary. Participant's consent was required to gather data on the following: a program of study, gender, years of study, the number of group term projects completed to date, the content of their four PEs, and grades. To ensure the teacher treated participants and non-participants in the same way, another teacher (researcher's assistant) from the Business and Administration Department collected consent forms. She verified that each consent form was properly completed and kept them in a sealed envelope until the teacher submitted course grades to the College at the end of May 2014.

Three students out of 53 opted out of the study. They still completed the PEs and exit survey to obtain their participation points. However, their data was destroyed and not tabulated in this research. The researcher's assistant kept the consent forms and questionnaires in sealed envelopes, in a locked cabinet located in a locked office.

CHAPTER FIVE
PRESENTATION OF RESULTS

This chapter describes the results of the study that focused on the research questions: 1) Are there differences between the private PE and the public PE? Specially, what is the impact of these PE forms (private vs. public) on grades, student's self-beliefs and ability to self-assess? 2) How did these students respond to the different PE forms differ based on the following variables: gender; academic profile (AP); student's year of study.

1. DEMOGRAPHICS OF SAMPLE STUDIED

1.1 Genders and Programs Breakdown

The sample for this study was made up of 50 students with an even split between the genders: 25 female and 25 male participants. The majority of students in the course were enrolled in the Accounting Program (72%) with the smaller

percentage coming from the Marketing Program (28%). Table 1 below presents the breakdown of the participants according to gender and program.

Table 1
Breakdown of Sample by Programs and Genders

Genders	Accounting Program	Marketing Program	Total
Female	19	6	25
Male	17	8	25
Total	36	14	50

Although both programs share common interests, they have some major differences. The Accounting students are stronger in mathematics. Their program fosters more individual written assessments and less group-based assignments than the Marketing Program. Accounting students take more computer software application courses on a regular basis. As for the Marketing Program, the mathematic requirement is lower than in the Accounting Program. As such, some students are quite weak on this subject. The Marketing Program encourages a large number of group-based projects and oral presentations, throughout the three years of study. These students tend to be more expressive than their accounting counterparts.

1.2 Year of Study Breakdown

Table 2 shows a balanced sample in the year of study variable: 24 participants were in their first year of college study, two in their second year, 23 in their third year, and one in its fourth year.

Table 2
Breakdown of Sample According to Genders and Year of Study

Gender	Junior Students	Senior Students	Total
Female	11	14	25
Male	15	10	25
Total	26	24	50

1.3 Academic Profiles Breakdown

Academic Profile (AP) refers to the participants' individual performance in their respective course. Each participant is compared to other students in their course. The AP is based on the final mark in the course. To determine whether participants are strong, average, or weak in AP, their final course grade was compared to the average grade of the class. Those above the standard deviation are identified as strong in AP students; meanwhile, those with a grade below the standard deviation are considered as weak in AP. Those students with a grade within the standard deviation of the class average are identified as average in AP. Figure 1 below shows the breakdown of the sample according to gender and AP.

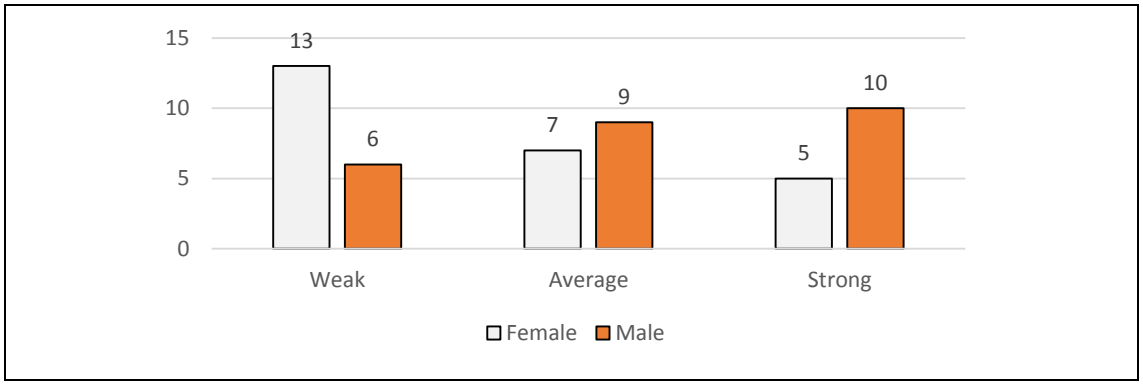

Figure 1
Breakdown of Sample According to Gender and Academic Profiles

In Figure 1, participants were relatively evenly divided among the three APs. There were 19 weak, 16 average, and 15 strong in AP participants. However, the distribution of AP and genders was not as an evenly spread. There were twice the number of female students categorized as weak in AP compared to their male counterparts (13 vs. 6). As well, there were twice the number of male participants categorized as strong AP compared to female participants (ten vs. five). The average in AP category had nearly equal numbers of females and males (seven vs. nine).

1.4 Experience Level with Group Work for the Participants

Generally speaking, it is reasonable to suggest that working as a team is a skill that can improve over time. This study asked participants to indicate their experience with group-based work since coming to CEGEP. The question read on the exit survey: "How many term or semester-long group projects (Business and non-Business related) have you completed at the CEGEP level before this course?" (Appendix D).

Approximately half of the participants believed they had limited experience with group work. However, there appeared to be some contradictions and misunderstandings in the answers students provided. For example, the concept of term or semester-long project was interpreted differently among the participants; some participants did not factor in the projects completed in non-Business courses. The answers were too subjective and contradictory. For these reasons, this variable was not reliable enough and therefore was not taken into consideration in the analysis of the results. The experience level of group work was better reflected in the variable year of study.

2. OVERALL STATISTICS OF QUESTIONNAIRES

Four PEs (two private and two public) were administered over a period of 15 weeks. The private PE followed by the public PE were each distributed twice, in that order. All PEs were in the form of a questionnaire (see Appendix A and B). The results from these questionnaires will be presented in the quantitative and the qualitative sections of this chapter. Table 3 shows the number of questionnaires distributed and used for the study.

Table 3
Number of Questionnaires Distributed and Consent Used

Items	Distributed	Consent used
Private PE distributed	106	100
Public PE distributed	26	26
Exit survey distributed	53	50

Completion of questionnaires is a typical concern of survey research. Because of the design of this study, that problem was minimized with 100% of questionnaires returned. However, three students did not give consent to have their data used in the study. That data was destroyed.

The exit survey had 12 questions: seven quantitative questions (questions 1 to 5, 8 and 9). Questions 1 to 5 gathered data about the sample's demographics, and questions 8 and 9 measured perceptions. Questions 6, 7, 10 to 12 were open-ended questions and provided qualitative data. The qualitative questions will be covered after the quantitative data analysis presented in this chapter.

3. QUANTITATIVE DATA ANALYSIS

The following section presents quantitative data analyzed for this study. The data was gathered from the exit survey, the four PEs, and students' grades. Likert scales and comparative tools were used for the quantitative analysis. Findings are reported according to the survey questions and discussed in the next chapter. Percentage or absolute numbers represent the results. For each of the sections in the quantitative analysis, its purpose is presented, followed by the results.

3.1 Participants' Perception Regarding the Public Peer Evaluation

The exit survey (Appendix D), contained two questions to evaluate the participants' perception regarding (1) their ability to defend their position in the

public PE and (2) their belief that the public PE score reflected their actual contribution.

For these two questions, participants had to show their level of agreement to a statement by choosing their answer on a Likert scale. The scale offered five choices ranging from, "I strongly agree", "I agree", "I am indifferent", "I disagree", and "I strongly disagree". Participants circled on the survey the option that best represented their answer. The data was entered into an Excel document for analysis. Similar answers were added together and the results are illustrated in tables below. Answers in the "I strongly agree" and "I agree" categories were combined for analysis purposes. The same was done for "I disagree" and "I strongly disagreed" categories. Each question was analyzed according to gender, academic profiles, and year of study. Below are the results regarding participants' belief that the public PE reflected their actual contribution.

3.1.1 Public Peer Evaluation Score Reflected Participants' Actual Contribution to the Group-Based Project

The exit survey was "the public PE reflected my actual contribution to the group project. Circle the best answer". This statement gives an indication of students' belief regarding the public PE. There is an underlining assumption in this question: by expressing their comments and opinions in the public PE, the PE score will more likely reflect the student's actual contribution to the group-based assignments. All participants only circled one answer. Therefore, the total number of occurrences adds to 50.

Table 4 below shows a total of 38 participants agreed or strongly agreed with the statement (three-quarters of the sample). They believed the public PE reflected their

actual contribution and the public PE score was in line with their expectations.

Table 4
Participants' Answer to the Statement "The Public Peer Evaluation Reflected my Actual Contribution to the Group Project" According to Gender

Gender	Strongly Agree and Agree	Indifferent	Strongly Disagree and Disagree	Total
Female	20	3	2	25
Male	18	5	2	25
Total	38	8	4	50

Eight participants were indifferent to this statement. In total, 23 female and 23 male participants agreed or strongly agreed with the statement (Table 4). Considering gender differences in group-based work, it is not a major influencing factor in this belief. Next is the analysis based on AP, which is presented in Table 5. It reveals similar findings to the gender analysis. A large portion of weak, average, and strong in AP students agreed or strongly agreed with the statement.

Table 5
Participants' Answer to the Statement "The Public Peer Evaluation Reflected my Actual Contribution to the Group Project" According to Academic Profiles

Academic Profiles	Strongly Agree and Agree	Indifferent	Disagree and Strongly disagree	Total
Weak	14	4	1	19
Average	14	1	1	16
Strong	10	3	2	15
Total	38	8	4	50

Table 5 shows that 14 students weak, 14 average, and ten strong in AP students agreed or strongly agreed with the statement. Proportionally, that represents 73% of weak in AP students, 88% of average in AP students, and 66% of strong in AP students. Considering the high number and percentage, AP is not a major

influencer in this belief. Lastly, when analyzing this statement through the year of study, once again, the same conclusion is reached. Table 6 below shows at least three-quarters of juniors and senior student respectively agreed or strongly agreed with the statement.

Table 6
Participants' Answer to the Statement "The Public Peer Evaluation Reflected my Actual Contribution to the Group Project" According to Year of Study

Year of study	Agree and Strongly Agree	Indifferent	Disagree and Strongly Disagree	Total
Junior	18	5	3	26
Senior	20	3	1	24
Total	38	8	4	50

Table 6 shows that 18 junior participants agree or strongly agree with the statement, representing the majority of junior students; the same goes for senior students; 20 of them agreed or strongly agreed with the statement. Therefore, year of study is not a major influencing factor in this belief.

Overall, Tables 4, 5, and 6 demonstrated that participants, regardless of their genders, AP, or year of study, believed the public PE reflected their actual contribution to the group-based projects. A small portion, eight percent, disagreed or strongly disagreed with the statement.

3.1.2 Ability to Present and Defend My Position in the Public Peer Evaluation

This question was posed in the form of a statement as well. It read as follows: I was able to present and defend my position during the peer evaluation completed in-group. Circle the best answer (question 9 on exit survey). The purpose was to understand further the students' perception at expressing and defending their point of view in the public PE. Considering the population at this institution is highly diverse

culturally, and that English is sometimes the third language for the participants, some students may feel limited in expressing and defending their position. In turn, this weakness may impede their ability to present and defend their position in the public PE. This variable was analysed through the same variables, starting with gender.

Table 7
Participants' Answers to the Statement "I Was Able to Present and Defend My Position During the Public Peer Evaluation" According to Gender

Gender	Agree and Strongly Agree	Indifferent	Disagree and Strongly Disagree	Total
Female	21	1	3	25
Male	17	6	2	25
Total	38	7	5	50

In Table 7, three-quarters of the sample agreed or strongly agreed with the statement. The female participants represent 84% in comparison to 68% of male participants. However, there was a much larger number of male participants who were indifferent to the statement. Although the majority of the sample agreed with the statement, there is a small gender difference to consider. The next presentation of results focused on AP. Table 8 below shows no major difference among the AP.

Table 8
Participants' Answers to the Statement "I Was Able to Present and Defend My Position During the Public Peer Evaluation" According to Academic Profiles

Academic profiles	Agree and Strongly Agree	Indifferent	Disagree and Strongly Disagree	Total
Weak	14	3	2	19
Average	13	1	2	16
Strong	11	3	1	15
Total	38	7	5	50

For each AP, a proportion greater than 70% agreed or strongly agreed with the statement, that is 14 out of 19 students with weak in AP, 13 out 16 average in AP students, and 11 out of 15 strong in AP students (Table 8).

For the last variable, year of study, the same conclusion is drawn. Year of study has a very limited impact on the participants' belief in their ability to present and defend their position in the public PE process, as shown in Table 9.

Table 9
Participants' Answers to the Question "I Was Able to Present and Defend My Position During the Public Peer Evaluation" According to Year of Study

Year of study	Agree and Strongly Agree	Indifferent	Disagree and Strongly Disagree	Total
Junior	20	4	2	26
Senior	18	3	3	24
Total	38	7	5	50

Overall, Tables 8 and 9 revealed the AP and year of study have no major influence on the statement. However, Table 7 showed that female participants tended to agree or strongly agree with the statement in greater numbers.

3.2 Self-assessment Influence Through Peer Evaluations

For each of the PEs, students evaluated their individual contribution to the group-based assignment, i.e., self-assessment (SA). It is based on the same evaluation criteria. This SA is represented numerically (SA score), in the same manner as the other PE scores. It is done individually and confidentially on the private PEs. The purpose of this analysis is to compare how each SA influenced the PE scores. To recall the PEs sequence, participants completed a private PE prior to the public PE. The process is repeated after the second assignment, hence first round of PEs and second round of PEs.

A linear regression analysis was completed on SA scores and PE scores. Using Excel, each participant's SA and PE scores were entered in a data sheet where

a regression analysis was completed. Although the regression analysis will not predict to a certainty the relationship between the two variables, it will show how much one variable contributed and/or influenced the other. The SA is subject to a regression analysis in the following three situations: (1) the first SA score vs. the individual's public PE score in the 1st round, (2) the second SA score vs. the individual's public PE score in the 2nd round, (3) the first SA score vs. second SA score. In each of the situations, the SA is the independent variable. The regression analysis is subject to the three variables studied. The presentation of results focuses on the adjusted R Square as it accounts for the sample size. Regression results below 0.19 are very low; between 0.2 and 0.39 it is low; between 0.4 and 0.59 the score is moderate; 0.6 and 0.79 are strong; and above 0.8 is very strong.

Table 10 below summarizes the R Square results for each of these variables for the PEs in both rounds. Most of the results are considered very low to low, and no result is above 0.4. Therefore, other factors influenced the PE scores much more than the SA. Although they are low, there are some interesting results to highlight. Appendix L shows the regression analysis statistics for each round of PEs.

Table 10
Adjusted R Square Results for Self-Assessment Scores vs. Public Peer Evaluation Scores for Each Variables Studied

Variables studied	**Results for 1st Public PE**	**Results for 2nd Public PE**
Sample	0.2271	0.0692
Female	0.2127	0.2807
Male	0.1415	0.1015
Weak in AP	0.0482	0.0751
Average in AP	0.2332	0.0873
Strong in AP	-0.0594	-0.0337
Junior	0.1926	0.1713
Senior	0.3467	0.1765

3.2.1 Sample

For the public PE, the SA influences 22% of the score. In the second round, the SA's influence decreases even more to 7%. In the public PEs, participants have a chance to discuss their SA with their peers (Table 10). However, when analyzing the results in Table 10, it shows a misalignment between the SA and the individual's score in the public PEs. Therefore, in the public PE, other factors greatly contribute to the individual PE scores. Even though three-quarters of the participants believed the public PE reflected their actual contribution to the group-based project, their SA and public PE scores tell a different story. The way the students assess themselves privately is different from how the group sees or evaluates them, even when the student partakes in the discussion.

3.2.2 Gender

The female participants tell a different story from the sample results. The first SA influenced the first public PE at 21% and increased slightly to 28% in the second public PE (Table 10). It seems that female participants accounted for, or integrated some of the feedback, from the first round of PE to align their second SA with their teammates. Male participants tell an opposite story. In both public PEs, the SA influenced these PEs scores minimally; the percentage decreased from 14% to 10% (Table 10).

3.2.3 Academic Profiles

The first public PE shows various results throughout the profiles. The weak and the strong in AP participants had very low to anemic r square results in both public PEs. However, the average in AP participants' results resembles the sample's; on the first public PE, the first SA influenced the score at 23%, but it decreased to 8% in the second public PE (Table 10). The SA of the weak and the strong in AP

participants did not influence the public PE scores. Overall, other factors are more important in the public PE.

3.2.4 Year of Study

The last variable to analyze from Table 10 is the year of study. The public PEs do not substantially change, as the percentages are 19% to 17% for junior students. As for senior students, they have been working together for the past three years, and the results reflect that to a certain level. The first SA influenced the first public PE at 34% - the highest percentage among all variables. In the second public PE, the rate drops to the same level as juniors, i.e. 17%.

3.2.5 First Self-Assessment vs. Second Self-Assessment

A regression analysis was done between the first and the second SAs to see the possible relationship between them. Considering the participants obtained feedback from their peers in the first public PE from the teacher, and already completed a first SA, the purpose of this regression was to see if the first SA influenced the second SA. The R Square shows a very anemic result of 0.05% for the sample (Table 11). In this sample, the first SA did not affect the second SA.

Table 11
Adjusted R Square for the First Self-Assessment Score vs. the Second Self-Assessment According to Variable Studied

Variable Studied	R Square Adjusted
Sample	0.0489
Female	0.0882
Male	-0.0415
Weak in AP	-0.0056
Average in AP	-0.0525
Strong in AP	0.1347
Junior	0.0194

Senior	0.3842

The R Square for female participants is very low at 8%, and -0.04% for males. The first SA's influence on the second SA score was minimal for female participants and was non-existent for male participants (Table 11).

The results differ for AP. The results for the weak and the average in AP participants were non-existent at 0.5% (Table 11). When it comes to strong in AP students, their first SA influenced the second SA at 13% (Table 11). Strong in AP students, therefore took into consideration some of the outcomes of their first SA.

Lastly, senior students took into account the outcomes of their first SA much more than the junior students. It is the highest results at 38% for seniors (Table 11).

3.3 Self-assessment Scores vs. Peer Evaluations Scores: Over or Under

The following presentation of results compares the SA to how the peers evaluated the individual in all PEs. The purpose of this analysis was to see if the SA was on par with the peer's evaluations. Reading through the SA justifying comments, they were more personal and reflective. This analysis will reveal if this reflection is in line with the peers. To do so, PE scores were entered in a data sheet for each student. The individual's PE scores were averaged and compared to the SA. The same analysis was repeated for all four PEs. Detailed results are expressed in the number of occurrences and further explained in Appendix O. One of the following three outcomes occurred when comparing the SA with the average PE scores:

- *SA score is overvalued* - The individual wrote an SA score that is higher than the averaged PE score. The difference is positive and greater than 0.02. In this scenario, the individual believed their SA was higher than what the group believed.

- *SA score is similar* – The SA score is considered as similar when the difference between the SA and the averaged PE scores is between -0.02 and 0.02. It is the perfect scenario; the peers and the individual have the same view.
- *SA score is undervalued* – The individual wrote an SA score that is lower than the averaged PE score. The difference is negative and greater than 0.02. In this scenario, the individual believed their SA was lower than what the group believed.

3.3.1 Gender

In the first round of PEs, more than half of female participants overvalued their contribution in both PEs. When comparing the first and second private PEs, the numbers remained the same. However, when comparing the first and second public PEs, the number of female participants who overvalued their SA decreased by half; those who undervalued themselves nearly doubled, and the number of those who obtained similar score doubled in the second public PE (Appendix O, Table 92).

Approximately half of male participants overvalued their SA in both private PEs and in the first public PE. The number of male participants who undervalued their SA remained relatively the same throughout all PEs, with numbers ranging from four to six (Appendix O, Table 93). A large number of males had the same SA as their peers by the last public PE; 15 males out of 25 obtained a similar score. That is doubled the number of female participants who obtained the similar SA on the second public PE.

3.3.2 Academic Profiles

Table 94 in Appendix O shows a little less than half of the weak students overvalued their contribution in the first round of PEs. By the second public PE, the

number decreased to twelve percent. The number of weak in AP students who obtained similar SA increased in the second round of PEs and doubled in the second public PE from four to eight (Table 94). However, the number of weak in AP students who undervalued their contribution also increased in the second round of PEs, and also almost doubled from five in the first public PE to nine in the second public PE. Overall, a greater number weak in AP students somewhat lost confidence in their SA throughout the four PEs, as the number of students who undervalued themselves increased.

As for the average in AP students, approximately 13 students out of 16 overvalued or obtained similar SA throughout all PEs (Appendix O, Table 95). Only three average in AP students undervalued their SA on most PEs, and that number remained the same relatively throughout all PEs. Therefore, a large portion of average in AP students remained more confident than weak in AP students in their SA.

Most strong in AP students overvalued their contribution through all PEs. Once again, strong in AP students remain confident in their contribution as more than 12 participants over 15 had a SA that is overvalued or similar to their peers (Appendix O, Table 96). Overall, AP influenced the SA scores of participants, especially for weaker in students.

3.3.3 Year of Study

More than half of junior participants overvalued their contribution in the first three PEs. This number drops to nine in the last public PE. The number of junior students who obtained a similar assessment increased from the first to the second round of PEs. By the second public PE, the number tripled from 4 for the first public

PE to 13 students (Appendix O, Table 97). As well, the number of students who undervalued their contribution remained relatively the same throughout the process (Appendix O, Table 97). Overall, a large portion of junior students remained confident in their SA as more than 20 junior students out of 26 overvalued or obtained similar scores throughout all PEs.

More than half of senior students overvalued that SA in the first three PEs, and this number decreased on the last public PE. Those who obtained an SA score similar to their peers remained low in the first three PEs but tripled in the last public PE to nine (Appendix O, Table 98). The number of students who undervalued their contribution is higher than junior students and increased slightly in the second round of PEs (Appendix O, Table 98). Overall, a large portion of senior students remained confident in their SA. However the numbers decreased slightly in the second round.

3.4 Impacts of Peer Evaluations on Individual Grades

For the teacher, PEs provide insights on students' contribution in group-based assignments completed outside of the class time. Therefore, for students who over or under contributed, their individual grade for the group-based project may change. The type of PE may favour some students over others. In the spirit of fairness, teachers need to be aware of these impacts to determine which PE to use. An analysis on how each PE impacted the students' individual grade was performed. The grades for the first and second team-based assignments were entered in Excel for each participant. The PE scores for all four PEs were entered for all participants. The data was grouped according to the variable studied to conduct a box plot analysis on each PE. A box plot shows the distribution of data according to four quartiles. Appendix J details the statistics for the box plot analysis.

Figures 2 and 3 below show the impact of grades according to gender. The presentation of results starts with the female participants. In Figure 2, the standard

deviation decreases over time slightly. Overall, the first public PE did not favour the female participants. Here are the main observations for the first round of PEs:

- the minimum grade is lower in the public PE compared to the first private PE;
- the maximum grade is lower on the first public PE;
- the median is the same at 77 on both PEs; the grades are more concentrated in the third quartile of the first public PE.

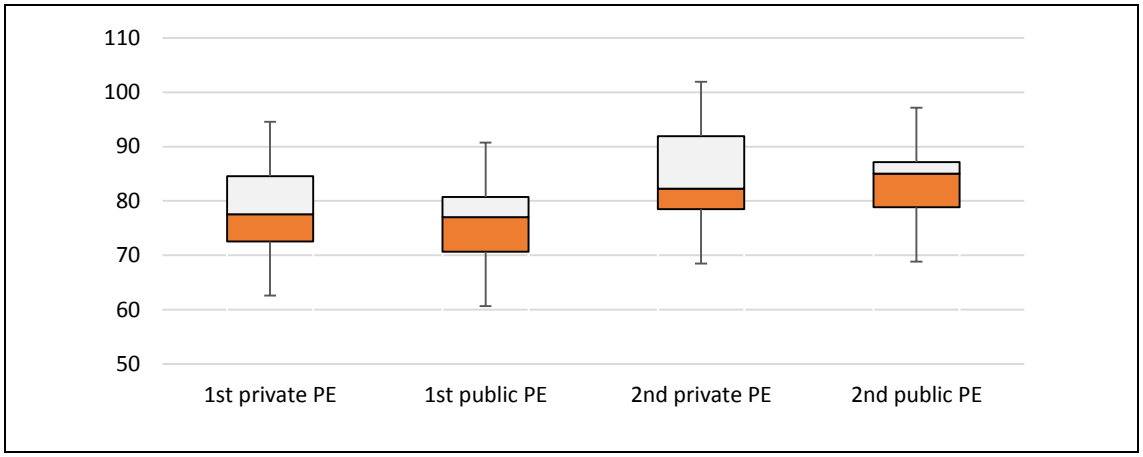

Figure 2
Impacts of Female Participants' Grades Through all Peer Evaluations

The second round of PEs reaches similar conclusions, with some differences. When comparing the second private PE to the second public PE in Figure 2, the following observations are identified:

- the maximum grade is higher on the private PE, once again;
- the median grade is higher by 2.7 on the public PE;
- the standard deviation of the third quartile in the private PE is greater than the second public PE's third quartile;
- the spread of grades is more concentrated in the public PE.

Although the median increased from 82.3 on the private PE to 85.0 on the public PE, the second public PE did not penalize female participants as much as the

first public PE, but it did not favour them. Female participants obtained better grades on both private PEs.

Now, let's see if the male students tell a similar story. Overall, the first public PE favoured males as they were more likely to obtain higher scores than female participants. In Figure 3 below, the following observations are seen in the first round of PEs:

- the maximum grade drastically increased from the private PE to the public PE;
- the medians are relatively the same on both PEs - with a grade of 79 on the private PE and 80 on the public PE;
- the fourth quadrant's standard deviation is considerable on the first public PE.

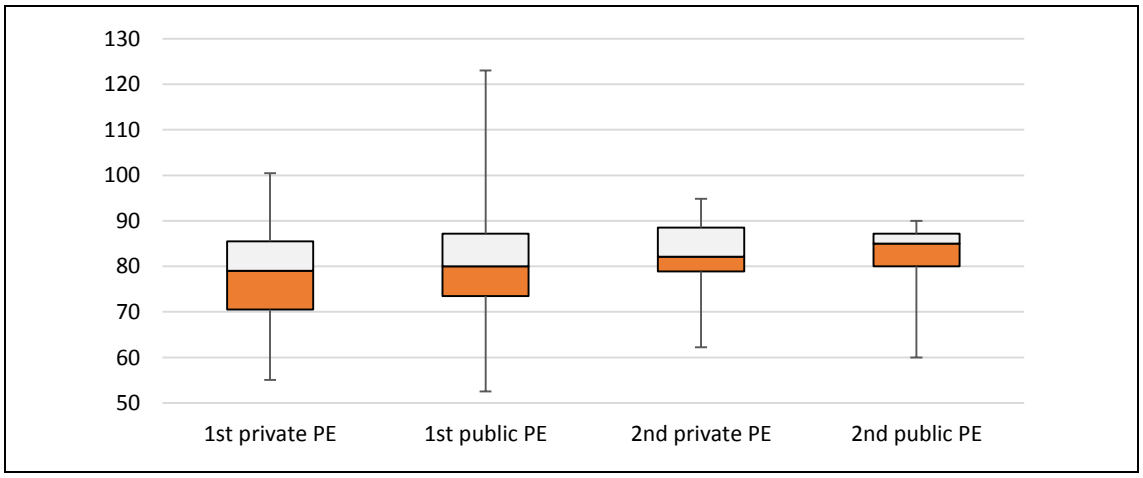

Figure 3
Impacts on Male Participants' Grades Through all Peer Evaluations

As for the second round of PEs, the impact on their grade resembles those of the female participants. These observations are seen in Figure 3:

- the maximum score decreased from 94 to 90 (same as females);
- the median increased from 82 to 85 (same as females);
- the spread in the third quartile much smaller on the public PE (same as females).

The second private PE offered a relatively more normal distribution of the PE scores as opposed to the second public PE. In the latter, the scores are more concentrated, especially is the third and fourth quartiles. Overall, male participants are not at a major disadvantage in either PEs. Considering that grades tend to normalize for both genders by the second round of PEs, there was a difference according to AP. Figures 4 to 6 present these results.

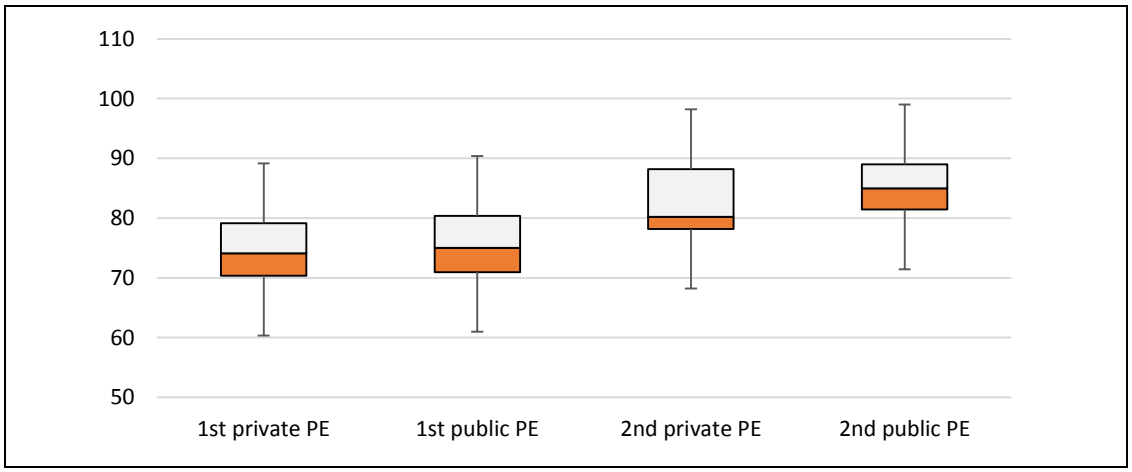

Figure 4
Impacts on Weak in Academic Profile Students Grades' Through all Peer Evaluations

Figure 4 shows that weak in AP students scored relatively the same on the first private and public PEs. The distribution of the PE scores is relatively normal in the first round of PEs. However, on the second round of PEs, the median increased from 80 on the private PE to 85 on the public PE. Weak in AP students obtained better scores on the second public PE in comparison to the second private PE. However, the distribution of the grade was more concentrated in the second public PE (Figure 4). Weak in AP students are at an advantage on the second PEs, especially the second public PE.

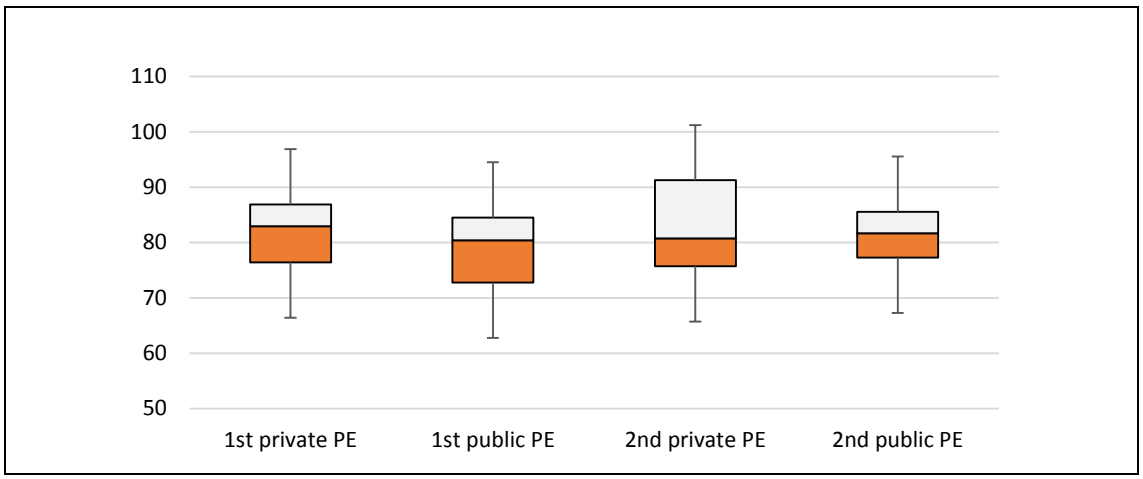

Figure 5
Impacts on Average in Academic Profile Students' Grades Through all Peer Evaluations

Figure 5 shows minimal changes on the medians throughout all four PEs. It ranged between 80 and 82. On the first round of PEs, average in AP students scored higher on the private PE then on public PE in all quartiles. On the second round of PEs, the standard deviation is greater in the private PE's third quartile. The distribution is more concentrated in the second and third quartiles, in the second public PE (Figure 5). Average in AP students obtained better grades on the private PEs, especially on the second one.

Figure 6 below shows that strong in AP students received better scores on the private PEs in comparison to the public PEs overall. This is similar to average in AP students. Although the median increased from 79 on the first private PE to 84 on the first public PE, the grades are lower in all quartiles in the first public PE. The distribution of scores is relatively normal in the first private PE. However, in the first public PE, the second quartile is heavily skewed, and the scores in the third quartiles are heavily concentrated.

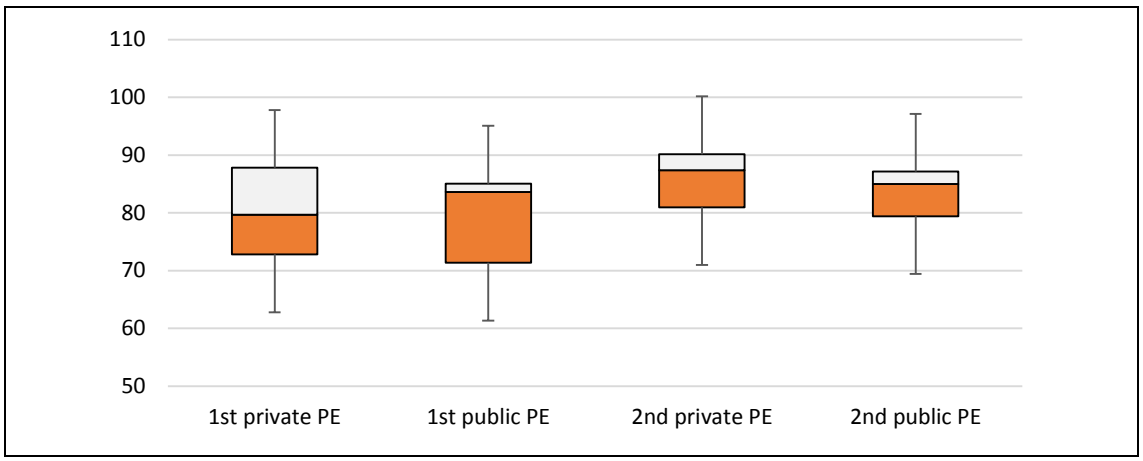

Figure 6
Impacts on Strong in Academic Profile Students' Grades Through all Four Peer Evaluations

By the second round of PEs, the medians decreased a bit from 87 on the private PE to 85 on the public PE, and all quartiles are lower on the second public PE (Figure 6). The distribution of grades is concentrated in the third quartiles for both PEs and especially in the second public PE (Figure 6). As for the quartiles, they are relatively normal. Strong students are best served with a second private PE.

3.5 Correlation Analysis

Correlation analysis explores the linear relationship between two variables. The independent variables studied were gender, AP, and year of study. See Appendix K for a detailed description of the variable correlated and the steps taken. Overall, all the correlation scores were very low to anemic. Therefore, no substantial conclusions were drawn, and the results were not factored in this study.

4. QUALITATIVE DATA ANALYSIS

As of now, the comparative study identified some key points for teachers to consider when using PEs. It demonstrated that about three-quarters of participants,

regardless of the variables studied, believed that the public PE reflected their actual contribution to the group-based projects.

The result of the SA's influence on the public PE is anemic to low overall. However, the SA influences the public PE score for female participants more than male participants; it has almost no impact on the public PE scores for weak and strong in AP participants; and the SA of senior students influenced the first PE score, much more than the second public PE score. The first SA anaemically influenced the second SA.

Lastly, when it comes to the impacts of PE on grades, male participants are not at a major disadvantage in either PEs. The public PE did not favour the female participants, especially the first public PE. As for AP, weak in AP students are at an advantage on the public PEs, especially the second one; average in AP students obtained better grades on the private PEs, especially on the second one; and strong in AP students are best served with the second private PE.

The second part of the results chapter is the qualitative analysis. The data were analyzed using standard qualitative data analysis methods; meaning that answers were entered into a spreadsheet, and then carefully examined for patterns in the data. Patterns of codes emerging from the data were then used to perform a content analysis. Once the analysis was performed, categories emerged from these coded answers.

The unit of analysis was the occurrence of an idea that was subsequently considered a code in the content analysis. Therefore, while some students wrote a lot and others a little, only the first instance of the coded answer would be counted. On the other hand, some answers contained more than one idea, therefore, would be coded into two categories. Raw counts of instances were then converted into a percentage to compare across the variables studied.

4.1 Peer Evaluation Process Allowed for Reflection

The exit survey (Appendix D) asked the following question: did the process allow you to reflect on your role and contribution to the group. The purpose of this question was to understand if participants recognized the added value of the public PE. Many of the participants assumed the "process" included both PEs. After a thorough analysis of participants' answers, it was concluded that the question was misleading. This section briefly summarizes the results. Refer to Appendix I for detailed results.

For the open-ended question, all participants started their written answer by agreeing or not with the statement. This first part of the answer, yes or no, was tabulated. In-between answers such as "a little" or "somewhat" were categorized as "somewhat yes/no". The results indicated that 94% participants answered yes to the statement, two percent of participants responded no, and four percent fell into the somewhat percentage.

The second part of the answer was a justification. The answers were read and categorized as *self-feedback* and *group feedback*. In the first category, participants believed the process provided comments about themselves. Key words included I, my strength/weakness. As for g*roup feedback*, participants saw the process mainly outlined comments about the group. Key words included *group and we.* See Appendix I, Table 30 for sample quotes representing each category. For *self-feedback,* approximately 70% of the participants said the process provided feedback about themselves, while about 23% learned more about the group. The distribution between genders is relatively equal. *Self-feedback* is still the main feedback obtained among APs and year of study. However, strong in AP students learned more about their group during this process, in comparison to weak and average in AP students.

Although the question was somewhat misleading, it brings up an interesting point when considering the regression analysis of the first SA vs. the second SA (Table 11). The adjusted R Square concluded the first SA did not influence the second SA. Therefore, the PEs process allowed the participants to learn more about themselves than the SA.

4.2 Benefit and Drawback of the Private Peer Evaluation

Now that it is established that participants learn more about themselves in the PE process, what were the benefits and drawbacks for each PE the participants identified. The exit survey asked the participants to name one benefit and one drawback of the private PE (Appendix D). The purpose of this open-ended question was to see if participants were able to identify the strength and weaknesses of the private PE. This question pinpoints what students focused on mainly. The results are presented in two parts: benefits and drawbacks.

4.2.1 Results of Benefits of Private Peer Evaluation

The total number of occurrences came to 55, where 29 answers came from male participants and 26 from female participants. Five categories emerged from the coding of the responses to the questionnaire data for the following question: Name one benefit and one drawback of the peer evaluation completed individually and confidentially. The five categories are as follow: (1) honesty, (2) protests participants, (3) self-reflection, (4) informs the teacher, and (5) team reflection. Items that could not be categorized, or if there was no response indicated, were put into the category of "unclear/no answer." The categories are elaborated below.

- *Honesty* – Students felt they could express themselves privately, truthfully, and without judgment from their peers. Key codes included: feel free, honest, confidential, express truly.

- *Protects participant* – Participants felt the private PE preserved their relationships from potential retaliation from others or group pressure. Key codes included: no retaliation, no pressure from others.
- *Self-reflection* – The private PE provided an opportunity to reflect on their individual contribution and in the group. Key codes included: yourself, reflect own.
- *Informs the teacher* – Students believed this PE informed the teacher of what happened in the group, outside of class. It is important to the students to inform the teacher. Key codes included: teacher, teacher evaluate.
- *Team reflection* – The private PE helped them understand their team; they can identify strengths and weaknesses of the team. Key codes included: were we, our, and team.

The results of the content analysis are presented in Table 11. It shows the distribution in percentage, and examples of quotes for each category are presented.

Table 11
Categories and Distribution of Answers for the Benefits of the Private Peer Evaluation

Categories	Distribution	Quotes Representing the Categories
Honesty	51%	*"You are free to write what you think and what you felt without any fear."* *"Permits for a chance to give feedback about the team members in an honest and confidential manner."* *"A team member can write the things that she/he cannot tell in front of the group member."* *"Allows us to express how we really feel."*
Self-reflection	16%	*"Reflect on your actions in details."* *"I can get to see if I value my teammates myself and if I really did was part in the project"* *"Find one's own strength and weaknesses:*
Protects participant	13%	*"There's no retaliation and you can openly voice your honest opinion…"* *"The benefit is that I get to voice my opinion rather than making social compromises in group."*
Informs teacher	7%	*"Teacher can see who did more work"* *"You get to evaluate yourself fairly to the teacher."*
Team reflection	7%	*"We realise how much we are tight as a team"* *"Knowing strengths of team members"*
Unclear/no answer	6%	*"You get to hear everyone's actual opinion"* *"Give feedback to peers for improvement"*

Table 11 shows that more than half of the participants identified *honesty* as the main benefit of the private PE. In second and third place were *self-reflection* and *protects the participants* with 16% and 13 % respectively. Overall 87% of the benefits fell in the *honesty, self-reflection, protects the participants* and *informs the teacher* categories, and were mainly about benefits for the individual student. Only seven percent of participants saw that the private PE allowed them to reflect on the team (Table 11). Next, these results were examined by sorting them by gender.

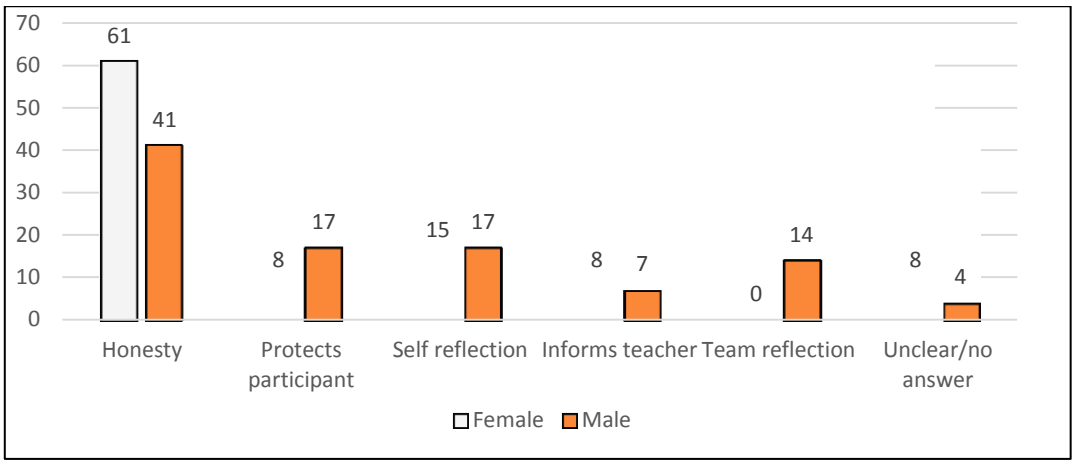

Figure 7
Categories of Answers for Benefit of Private Peer Evaluation According to Gender Shown in Percentage of Responses.

Figure 7 shows that *honesty* is of greater importance to female participants compared to their male counterparts, at 61% vs. 41%, respectively. Double the percentage of male participants reported that *protecting participant* was more important compared to female participants (Figure 7). The categories of *self-reflection* and *informs teacher* were similar for both genders. Interestingly, only male participants highlighted *team reflection* (Figure 7). When the data for this question was examined and sorted by the APs, the results showed some different patterns. Table 12 shows the findings.

Table 12
Categories of Answers for Benefit of Private PE According to Academic

	Academic Profiles		
Categories	**Weak**	**Average**	**Strong**
Honesty	48%	50%	53%
Protects Participant	9%	17%	12%
Self-reflection	9%	11%	29%
Team reflection	10%	11%	-
Informs teacher	10%	11%	-
Unclear / no answer	14%	-	6%
Total	100%	100%	100%

H*onesty* is the main benefit across all three APs with approximately 50% of responses being categorized as such. It was most popular among average in AP students with 17%. Stronger in AP students identified *self-reflection* as a benefit at 29%, which is twice as much as the average and weak in AP students (Table 12). Furthermore, none of the strong in AP students identified *team reflection* or *inform the teacher* as benefits. For strong in AP students, the private PE's main benefits focused on the individual student, not the group (*honesty, self-reflection, and protects the participant)*.

The results for the year of study variable are similar to the gender variable. *Honesty* is the main benefit for both years at approximately 50% (Table 13).

Table 13
Categories of Answers for Benefit of Private Peer Evaluation According to Year of Study

	Year of Study	
Categories	**Junior**	**Senior**
Honesty	55%	46%
Protects Participant	7%	18%
Self-reflection	15%	18%
Team reflection	15%	-
Informs teacher	4%	11%
Unclear / no answer	4%	7%
Total	100%	100%

The second large gap is in *protects participant* where it is more common among seniors at 18% as opposed to seven percent for juniors (Table 13). Just as strong in AP and female participants, senior students did not identify *team reflection* as a benefit.

4.2.2 Results for Drawback of the Private Peer Evaluation

For the second part of the question, name one benefit and one drawback of the private PE, the number of occurrences totaled 50, where 25 answers came from male participants and 25 from female participants. Three categories emerged from the coding of the responses to the questionnaire's data for the question. These three are the following: (1) hard to evaluate, (2) lack of peer feedback, (3) getting revenge. Items that could not be categorized, answers that were inconsistent and unclear with the question, or space left empty, were put into the category of "unclear/no answer." The categories are elaborated below.

- *Hard to evaluate* – Participants said it was difficult to evaluate their peers on their own. Some of the codes included *bias, hindering friendship*.
- *Lack of peer feedback* – Answers showed participants realised they were missing information. They realised the benefit of talking with their peers to exchange feedback in their evaluation. Key codes included *only you*, and *considering other*.
- *Getting Revenge* – Participants see the private PE as an occasion to retaliate against their peers. Key expressions included *without them knowing* and *hold something against*.

Table 14 below presents the results for each category and its distribution in percentage. For each category, quotes were identified to illustrate the category. Table 14 shows the most common drawback was *hard to evaluate* at 40%. Many senior participants identified specific biases they may experience during the PEs. Words such as central tendency, halo effect, strictness, and leniency were mentioned. In their course curriculum, they were taking a Human Resources course at the same time as this course. These concepts were, therefore, fresh in their mind, and they were able to recognize them in their PEs. One of the reasons why PEs are hard, may be the lack of knowledge, skill, or *lack of peer feedback.* This last point was the second most common drawback at 28% (Table 14).

Table 14
Categories of Answers Provided Regarding the Drawbacks of the Private Peer Evaluations

Categories	Distribution	Quotes Representing the Categories
Hard to evaluate	40%	*"People may be too strict toward other group members."* *"It allows for central tendency because you don't know if you are judging the member to strictly"* *"There are some bias while evaluating since members having close friendships to another member will give higher grade to this person"*
Lack of peer feedback	28%	*"You only get to put your comments and what you think without considering other's opinion."* *"Not have the others opinions"* *"No insight from others."*
Getting revenge	14%	*"If any conflict in the group, one person can give a team member a bad grade without them knowing"* *"It's bad to hold something against a group member and not tell her/him directly"*
Unclear / no answer	18%	*"It takes a little too much time."* *"It can also bring teammates a part if they ever see it"*

The category of *getting revenge* shows that participants saw an opportunity to "even the scores" with their peers at a low cost. Considering the private PE is confidential, participants recognized it could be skewed in retaliation. Although they did not admit having done so, they were concerned others might do so. This category shows the PE was not solely based on the evaluation criteria written on the form, but the relationship between them was a large influential factor. Another good example is a quote from a junior female participant weak in AP saying: "*If someone in your group didn't like you, they will not be nice."* A junior male participant also weak in AP, wrote: "*if someone does not like someone else, he or she has the ability to bring down another one's grade"*. Both make references to "liking" their peers, which is

partly based on a personal relationship or friendships. Considering the importance of social network in their lives, it is most likely based on friendship.

Next, the categories for drawback of the private PE were analyzed according to the variables studied. Starting with gender, Figure 8 shows the distribution of answers among the categories is relatively even between genders.

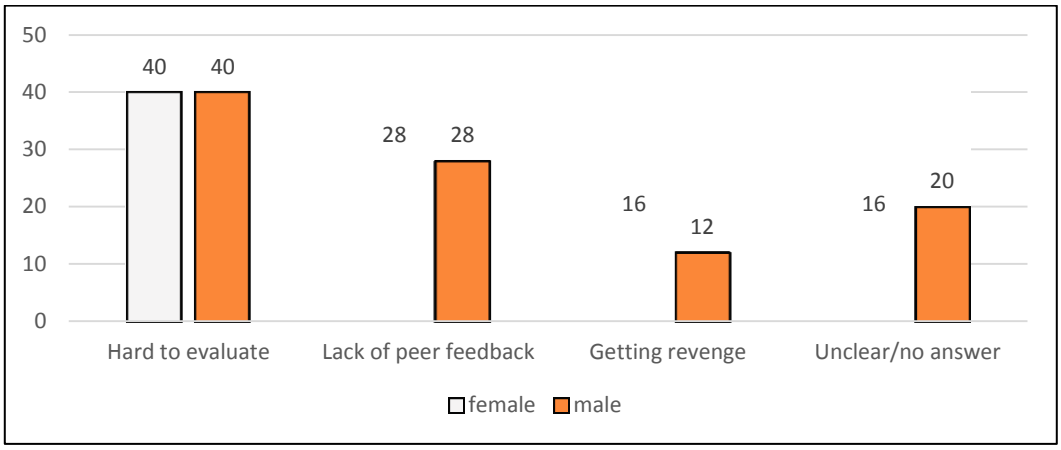

Figure 8
Categories of Answers for Drawback of Private PE According to Gender Shown in Percentage of Responses

Figure 8 shows the difference is in the categories of *getting revenge*. Numerically, the difference is one occurrence. Therefore, we can conclude the categories of drawback are not subject to gender. When analyzing the categories according to APs, Table 15 below reveals approximately one-third of participants found the private PE *hard to evaluate*, especially the average in AP students.

Table 15
Categories of Answers for Drawback of Private PE According to Academic Profiles

	Academic Profiles		
Categories	**Weak**	**Average**	**Strong**
Hard to evaluate	32%	40%	37%
Lack of peer feedback	10%	31%	44%

Getting revenge	37%	-	-
Unclear / no answer	21%	19%	19%
Total	100%	100%	100%

Strong students in AP mainly identified *lack of peer feedback* at 44% and *hard to evaluate* at 37%, which go hand in hand (Table 15). However, weak in AP students are the only ones concerned with *getting revenge* (Table 15). The comments of weak in AP participants were concerned with other team members retaliating secretly in the private PE. They believed they might be victims.

Moving on to the year of study variable, Table 16 below shows that 67% of senior students recognised the difficulty of evaluating peers as compared to 15% of junior students. However, juniors were more concerned with the lack of peer feedback at 35% (Table 16). Junior students may have mistrust, or limited understanding of the PE, especially private PE. At the college level, they completed less group-based project than the senior students, therefore their experience level with PE is limited.

Table 16
Categories of Answers for Drawback of Private Peer Evaluation According to Year of Study

	Year of Study	
Categories	**Junior**	**Senior**
Hard to evaluate	15%	67%
Lack of peer feedback	35%	21%
Getting revenge	19%	8%
Unclear / no answer	31%	4%
Total	100%	100%

As students mature, their sense of morality and judgment evolves to welcome more shades of gray and nuances. They realize the complexity of evaluating each other. Some senior students recognized that some team members might have outside

responsibilities that are hindering their contribution. They are perplexed as to how to factor this information in their evaluation, even if the PE criteria are clear. A senior male strong in AP wrote: "*the justification of members grades, in a written format, it is sometimes difficult to pinpoint.* It illustrates that as students advance in their program, they see the difficulties in fairly evaluating their peers. A senior female student strong in AP also wrote: "*If I'm really tired, I tend to group everyone around the middle so the evaluation is quicker*". She recognized that sometimes, mental capacities skew the PEs. Luckily she ended her comment with: "*I wasn't too tired today!!*"

4.3 Benefit and Drawback of the Public Peer Evaluation

At this point, the participants identified *honesty* as the main benefit, regardless of the variable studied. The second benefit varied between *self-reflection* and *protecting the participants*. As for the drawbacks, it is *hard to evaluate* for average and strong in AP students, weak in AP students identified *getting revenge*, and junior, the *lack of feedback*.

The purpose of this next question, "name one benefit and one drawback of the peer evaluation completed in a group after reaching a consensus", was to see if participants were able to identify the strength and weaknesses of the public PE. Overall, this question pinpoints what students focus on, to see the differences with the private PE. The results are presented in two parts, first the benefits followed by the drawbacks.

4.3.1 Results of Benefits of the Public Peer Evaluation

The first part of this question is to identify one benefit of the public PE. Some of the answers qualified for more than one category. Therefore, the total number of occurrences is 55, where 26 occurrences came from females and 29 from males. Five

categories were identified: (1) agreement and maintaining peace, (2) fairness, (3) improve team performance, (4) opportunity to defend, (5) peer feedback. Items that could not be categorized, unclear or inconsistent answers, or empty space, were put into the category of "unclear/no answer." Here are the categories:

- *Agreement/maintaining peace* – Participants believed the public PE leads to better agreement and consensus among members, which favoured a peaceful climate. Key codes included group, whole, agree.
- *Fairness* – Participants saw the process as fair and believe it provided more accurate results. Key words included fair and accurate results.
- *Improve team performance* – Through the discussion, participants believed the public PE offered an opportunity to improve the team's performance. Key codes included improvement, future presentation, group.
- *Opportunity to defend* – All members of the team can provide their inputs to each *other to influence and explain their points.* Key codes were*: discuss, chance to explain, opportunity.*
- *Peer feedback* – Participants exchange feedback on individual contribution or performance. Key codes were feedback, critics, other's opinion; what others think.

Table 17 below presents the distribution in percentage and sample quotes representing the category. The most common answer is *peer feedback* at 33%.

Table 17
Categories and Distribution of Answers for the Benefits of the Public Peer Evaluation

Categories	Distribution	Quotes Representing the Categories
Peer feedback	33%	*"There are more feedbacks given"* *"You can improve yourself by the critics you receive."* *"You can see what your group thought about working with you"*
Improve team performance	20%	*"We discuss the pros and cons about what to improve"*

		"Help each other on what we need to improve individually or as a group"
Opportunity to defend	20%	*"You get to appreciate other person's effort."* *"They can recognise what they did wrong when we speak to them directly"*
Agreement and maintaining peace	11%	*"All members agree together for the final mark"* *"Marks tend to be better overall as members do not want to speak negatively in front of everyone."*
Fairness	11%	*"fairness""It is fair, everybody in the group knows how you worked."*
Unclear	5%	*"Someone might be shy and not tell what they wrote"*

Students see the value in obtaining peer feedback. However, it did not seem to be an exchange. Students appear to look for what others think of them. For example: "I get to see what my teammates think of me" supports this one-sided view. When the public PE was introduced to the class, one of the main strengths stressed was the value of obtaining feedback from sources other than the teacher. That point most likely stayed with the participants. As well, the teacher emphasized that it is a safe place to discuss what has happened in the team to improve for the following time. Therefore, it is logical to see an opportunity to defend and improve team performance arrive in the second and the third place with 20% each (Table 17).

The opportunity to defend category focused on the opportunity to discuss. A strong in AP senior male wrote that "everyone shares their opinions about the group and things that should stay hidden tend to come out." It showed that participants see the public PE as a chance to discuss the work and defend their point, which they probably would not have done so otherwise. Although Business studies foster group work in a collaborative matter, many assessments will encourage a "divide and conquer" approach. As college students are loaded with group-based assignments, it may be challenging to meet to work on them and discuss regularly. Therefore, students meet infrequently to piece their individual parts together. Meetings may be unfocused at times. The public PE offered a forum to encourage discussion and collaboration.

The comments in the category of agreement and maintaining peace were not all positive. Some remarks referred to reluctantly reaching an agreement to maintain the peace. Peace and agreement were not always reached after revealing all truthful information. A senior female participant strong in AP wrote that "marks tend to be better overall as members do not want to speak negatively in front of everyone". A junior female participant weak in AP wrote there is a "pressure by group members not to give them a bad score; don't want arguments. Peace is reached, but there were concessions and perhaps information hidden to keep the peace. Having a peaceful dynamic favours the completion of the team-based assignments. Next, the analysis continues with the presentation of the results based on gender.

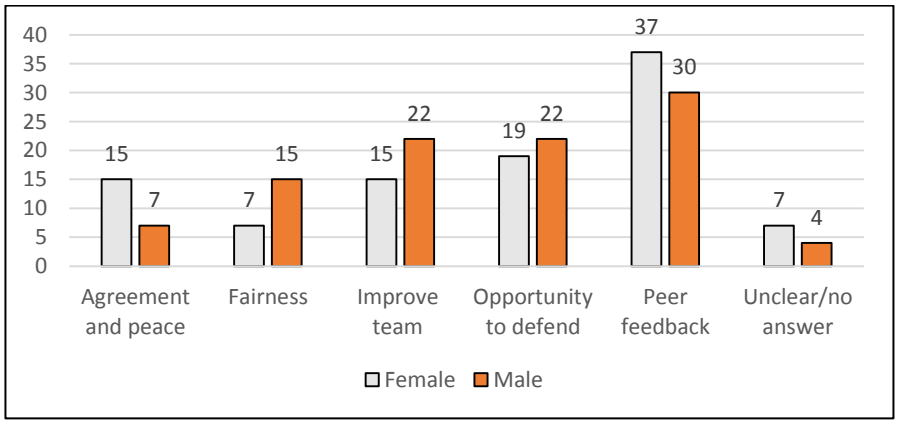

Figure 9
Categories of Answers for Benefit of Public Peer Evaluation According to Genders Shown in Percentage of Responses

Figure 9 shows that *peer feedback* is the most common response for both genders at 37% for female and at 30% for male participants. However, twice as many female participants opted for the *agreement/maintain peace* as opposed to their male counterparts (Figure 9). Male participants saw the opportunity to *improve the team* at 22%, which is a bit more than their counterparts (Figure 9). Female participants identified agreement and maintain peace at a slightly greater portion than males. Considering the size of the sample, there are minimal differences between genders.

The AP results are similar to the gender results. Table 18 below summarizes the findings. Table 18 shows that *peer feedback* is the most common benefit identified again for 35% of average in AP participants and 37% strong in AP students. Weak in AP students have two main benefits - *peer feedback* and *improve team performance* both at 27% (Table 18). The strong in AP students also recognized *fairness* and *agreement/maintaining peace* at 19% respectively, which is much higher than average and weak in AP students in both categories (Table 18).

Table 18
Categories of Answers for Benefit of Public Peer Evaluation According to Academic Profiles

	Academic Profiles		
Categories	**Weak**	**Average**	**Strong**
Peer feedback	27%	35%	37%
Improve team performance	27%	23%	6%
Opportunity to defend	23%	18%	19%
Fairness	9%	6%	19%
Agreement and maintaining peace	9%	6%	19%
Unclear / no answer	5%	12%	-
Total	100%	100%	100%

However, *improve team performance* is almost none existent among strong in AP students with only 6% of answers. It is very present in approximately one-quarter of weak and average in AP students (Table 18). This is similar to the *team reflection* benefit identified in the private PE; none of the strong in AP participants mentioned it, but weak and average in AP students listed it (Table 18). PEs for strong students seemed to provide opportunities to learn about themselves. The last variable is year of study. Table 19 below reveals no major differences between the juniors and seniors. Most participants, juniors and seniors identified *peer feedback* as the main benefit.

Table 19
Categories of Answers Main Benefit of Public Peer Evaluation According to Year of Study

	Year of Study	
Categories	**Junior**	**Senior**
Peer feedback	37%	28%
Opportunity to defend	22%	18%
Improve team performance	22%	18%
Fairness	4%	18%
Agreement and maintaining peace	11%	11%
Unclear / no answer	4%	7%
Total	100%	100%

The distribution is the same for *opportunity to defend, improve the team performance,* and *agreement/maintain peace,* respectively with 22%, 22% and 11% for juniors, and 18%, 18% and 11% for seniors (Table 19). *Fairness* is the main difference as it is a popular benefit for 18% of senior participants, but not as much for junior participants (Table 19).

4.3.2 Results for Main Drawback of the Public Peer Evaluation

After asking for the positive point of the public PE, the survey asked for one drawback. Table 20 compiles the answers for a total of 55 occurrences, where 29 occurrences came from female participants and 26 from male participants. Items that could not be categorized, or the space was left empty, were put into the category of "unclear/no answer. The emerging categories are as follow:

- *Conflict*: Participants feared potential disputes and conflicts in the team. Key words included: *tensions; problems, face members, disagreement.*
- *Hide information*: Participants did not wish to share particular information with the rest of the group. Decisive key words included: *not express, don't want to share, and no actual issues.*

- *No bad grade*: Participants recognized that giving a poor score openly was difficult, therefore, they avoid doing so. Key words included: *good evaluation, no bad grade, and grade is not accurate.*
- *Unpleasant to give negative feedback:* Students were concerned with how the feedback, especially the negative comments, may be received by their peers. Defining words are*: difficult to face people, harsh truth, and may hurt.*

All of the categories identified show that the public PE most likely hindered the relationship among peers. Table 20 below presents the distribution in percentage for each category. The leading drawback, with 36% of responses, is *conflict.* Two categories are negative consequences or strategies of avoiding conflict and the unpleasantness of giving negative feedback. To maintain peace, one may *hide information,* or avoid assigning *bad grades*. Overall, there was a spirit that all may not be revealed in the public PE.

Table 20
Categories and Distribution of Answers Provided for Drawbacks of the Public Peer Evaluation

Categories	Distribution	Quotes Representing the Categories
Conflict	36%	*"Can cause group problems"* *"tension might rise and not everyone will agree"* *"Creates arguments and causes the group chemistry to decrease"*
Hide information	22%	*"Sometimes there are things that you don't want to share."* *"Not everyone said what might need to be said."* *"People don't express actual concerns and issues. They just put "neutral" thing."*
Unpleasant to give negative feedback	22%	*"It doesn't feel good to evaluate negatively in a person, specially if the team doesn't work well with each other."* *"you don't to want to hurt someone's feeling when you express yourself"* *"Since it is done together, there are some thing that constrict your opinion because you fear that you*

		might upset them."
No bad grade	9%	*"No one wants to give anyone a bad grade."* *"Everybody sees it therefore, every body gets a good evaluation results"*
Unclear/no answer	11%	*"inaccurate task"*

A senior male average in AP wrote: "*some people have strong personalities and different beliefs which can lead to tension."* There is a sense that conflict arises because of strong personalities or hurt feelings. These are reasons linked to relationships shared among students. According to participants, conflict can lead to animosity, tension, problems, and disagreement, which are the words used by the participants.

Participants found it unpleasant to give negative comments at 22% (Table 20). They were concerns with their peers' feelings, or how they would feel when giving the negative feedback. Therefore, some participants avoided this situation by simply *hiding information*, which is represented at 22% (Table 20). Telling the "*harsh truth*" as a participant wrote, may be difficult to do, or hard to hear. Therefore, some participants simply avoided it. Some students remained neutral or avoid giving bad grades. Continuing the presentation of results according to the variables studied, starting with gender. Figure 7 below shows no major differences in the sample.

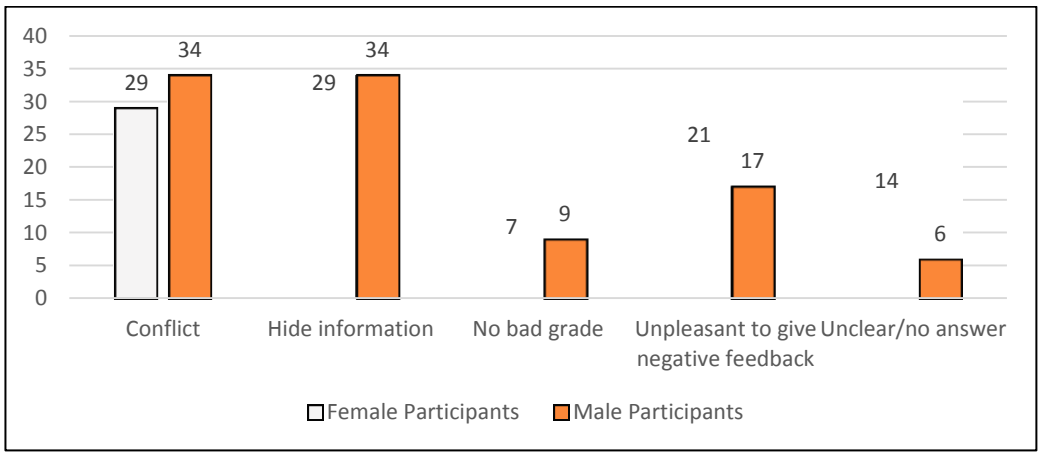

Figure 10
Categories of Answers for Main Drawback of Public Peer Evaluation According to Gender Shown as a Percentage of Responses

In Figure 10, both genders somewhat follow one another in the categories. *Conflict* and *hide information* are the reasons mostly identified for both genders. Therefore, gender is not a major influential factor in identifying the main drawback of the public PE. The APs, however, reveal some differences.

Table 21
Categories of Answers for Drawback of Public Peer Evaluation Based on Academic Profiles

	Academic Profiles		
Categories	**Weak**	**Average**	**Strong**
Conflict	38%	41%	29%
Hide information	19%	18%	29%
No bad grade	15%	6%	6%
Unpleasant to give negative feedback	14%	29%	24%
Unclear/no answer	14%	6%	12%
Total	100%	100%	100%

In Table 21, *conflict* is identified more often among weak and average in AP students with 38% and 41% respectively. However, strong in AP students identified *hide information* and *conflict* at 29% respectively. Average and strong in AP students listed *unpleasant to give negative feedback* at 29% and 24%, as opposed to 14% for weak in AP students. Moving on to the presentation of results based on year of study.

Table 22
Categories of Answers for Drawback of Public Peer Evaluation According to Year of Study

	Year of Study	
Categories	**Junior**	**Senior**
Conflict	40%	32%
Hide information	20%	24%
No bad grade	13%	4%
Unpleasant to give negative feedback	17%	28%
Unclear/no answer	10%	12%
Total	100%	100%

Once again, conflict is the main drawback at 40% for juniors at 32% for seniors (Table 22). A bit more senior students, 28%, found it *unpleasant to give negative feedback,* which is more that junior students at 17% (Table 22). More junior students identified the category of *no bad grade,* at 13% (Table 22).

4.4 Participants' Preferred Peer Evaluation

One of the ending questions of the exit survey asked, "which peer evaluation did you prefer" (Appendix D). This open-ended question had two segments. First, students had to circle their preference between private PE and public PE. There was a total of 50 unique answers. In the second part of the question, students justified their choice. Although preferences were subjective, it indicated which PE the participants were most comfortable with. When the student was comfortable or felt safe, they would be at ease to enjoy the benefits and the learning from the activity. Appendix M details the results for students' preferred PE.

4.4.1 Reasons for Preferring the Private Peer Evaluation

The sample was divided almost equally among the PEs: 48% of participants preferred the private PE, and 48% preferred the public PE. Even if it was not a clear option on the exit survey, four percent of participants, opted for both PEs. When

breaking down these results according to the studied variables, here are the key findings.

- Gender is not a major influential factor in the preferred PE. The preferences are evenly split between genders (Appendix M, Figure 12). Only two male participants opted for both PE.
- AP influenced the PE preference. Twice as more average in AP students preferred the public PE (Appendix M, Table 79). The distribution between both PEs among weak in AP students was about the same. As for strong in AP participants, one-third more participants preferred the private PE (Appendix M, Table 79).
- The year of study had some influence as well on the PE choice. Approximately forty percent more junior over the senior students preferred the private PE. As opposed to approximately forty percent senior students preferred the public PE (Appendix M, Table 80).

For the second part of the question, four main categories of reasons stood out. The total answers added to 27 as some responses met the requirements of more than one category. The categories are similar to the ones identified in the benefit and drawback of both PEs. They are: *honesty*, *unpleasant to give negative feedback*, *avoid conflict*, and n*o influence from others.*

Just as the main benefits of the private PE, 59% of the participants who preferred the private PE identified *honesty* as the main reason (Appendix M, Table 81). The following quotes reveal that sentiment: *"Because you have more freedom to say what you want"(senior female average in AP); "I'm just comfortable keeping it confidential" (senior female weak in AP).* Fifteen percent of respondents opted for the private PE because they recognized that openly expressing feedback may have caused potential conflict and disagreement. The private PE was viewed as a way to avoid potential conflicts, tensions, and disagreements the public evaluation may cause.

When analyzing these reasons according to the three variables studied, the following observations are made:

- The reasons for preferring the private PE do not seem to be influenced by gender (Appendix M, Figure 13).
- Eighty percent of average in AP students found shelter in the *honesty* aspect of the private PE (Appendix M, Table 82). As well, they were the only ones who opted for the private PE as a way to avoid feelings associated with giving negative feedback.
- For year of study, *honesty* is the main reason especially for senior students. In smaller percentage, the other reasons for it were the *lack of influence from others* at 18% and to *avoid conflict* at 9% (Appendix M, Table 83).

4.4.2 Reasons for Preferring the Public Peer Evaluation

A total of 24 participants, 48%, opted for the public PE. Some of the answers fitted in multiple categories; therefore the total is 27 occurrences. The breakdown is 14 for female and 13 for male participants. The categories are the same as the ones listed in the benefits and drawbacks of public PE. They are *agreement/maintaining peace*, *fairness*, *improve team performance*, *peer feedback*, *opportunity to defend*.

Approximately one-third of participants preferred the public PE for its *fairness* and one third for *peer feedback*. The remaining third is spread among *opportunity to defend, improve team performance,* and *agreement/maintaining peace.* In *fairness,* the participants believed the public PE leads to more accurate results. Table 84 in Appendix M summarises the percentage of occurrences for each category, along with quotes.

Although*, peer feedback* was the main selling point when introducing the public PE to the class, it was only the preferred reason for one third of participants. A junior male strong in AP preferred the public PE *"because it's always easier and*

more instructive in group." Such an answer demonstrated that some participants truly grasped one of the main objectives of the public PE.

The results are broken down according to the three variables studies. Here are the main findings:

- There are some gender differences. *Fairness* and *peer feedback* are the top two reasons for both genders (Appendix M, Figure 14). It shows some key absences in certain categories. *Opportunity to defend* is preferred by 20% of female participants. *Agreement/maintaining peace* is also the preferred reason for 13% of female participants. No male participants identified the last two categories. Males are quite strong in *improving team performance* with 15%, while female participants are at zero.
- As for AP, *fairness* ranks highest among strong in AP students with 43% along with *peer feedback at* 43% also (Appendix M, Table 85). Strong in AP students are confident their work speaks for themselves and do not feel the need to take the *opportunity to defend* their work and contribution in the public PE. *Opportunity to defend* was mentioned mainly by weak and average in AP students.
- When it comes to year of study, *peer feedback* is the preferred reason for 40% of senior students, followed by *fairness at 35%* (Appendix M, Figure 15). Once again, the exchange of feedback may be viewed as a way to reach more accurate and fair evaluations. *Opportunity to defend* is mainly chosen among junior students.

4.5 Participants' Peer Evaluation Scores Justifying Comments

On both PE forms, students had to write comments justifying the PE scores (Appendix A and B). The space was limited, but they had the option to use additional paper if needed. For the public PE form, students had to sign their names on the same form, confirming they agree to the content of the PE. The team submitted one public PE form. Participants had to evaluate their peers according to specific criteria

presented earlier in the research. They are also described on the PE forms. They are: (1) attendance and punctuality, (2) meaningfulness of the contribution, (3) meeting deadlines**,** (4) quality of the work, and (5) attitude. Just as other content analysis in this study, the comments were coded according to the above criteria. Additional comments not categorized were coded as (6) other. Items that could not be categorized were classified as "unclear/no answer."

The content analysis revealed some similarities for the private and the public PE. First, participants did not comment on all of the evaluation criteria; they focused on a few only. Second, many negative comments are accompanied by positive comments; the positive comments greatly outnumbered the negative comments. Third, not all comments were about the evaluation criteria. Many participants wrote about times spent on a task, roles in the team, or the level of effort or energy. For example, a comment for a senior female student weak in AP was "very active, dependable, a leader, excellent in communication, presentation, and "saving skills"". Unfortunately, terms such as active and time spent do not say if the level of activity and time met the teams' expectations or met standards. There is a certain level of importance on these items, even only the outcome of the assignment is evaluated.

In the *other* category, comments such as leader, the division of task, and coordinator were identified. They were not qualified as good or poor, making it harder to understand the justification. However, it appears to be additional tasks, or clearly identifiable tasks taken by or assigned to the participant. They were not always rewarded with higher PE score. From the first to the second round of PEs, some participants talked about improvements and efforts to justify the PE score. For example, a junior male strong in AP wrote, "*overall, her work was very well done and she had show improvements from previous oral*."

4.5.1 Participants' Comments Justifying the Private Peer Evaluation Scores

Table 23 below summarizes the PE evaluation criteria categories and its distribution in percentage for the private PE for the sample. The number of occurrences decreased from the first private PE with 400, to 373 in the second private PE.

Table 23
Categories and Distribution of Participants' Justifications for the Private Peer Evaluations Scores

Categories	Distribution for 1st Private PE	Distribution for 2nd Private PE
Attendances and punctuality	17%	9%
Meaningfulness of contribution	23%	25%
Meet deadlines	12%	11%
Quality of the work	21%	25%
Attitudes	21%	20%
Other comments	6%	10%
Total	100%	100%

The distribution of comments remained somewhat the same from the first to the second private PE (Table 23). There was a decrease of eight percent from the first private PE to the second private PE in the *attendance and punctuality* category. The comments were further categorised into positive and negative. When it comes to the positive and negative comments, participants largely wrote positive comments. They represented 87% of the comments in the first private PE and the rest were negative (Appendix N, Table 87). The percentages and the distribution remain the same in both private PEs.

4.5.2 Observations Unique to the Private Peer Evaluations' Justifying Comments

There are a few interesting and unique observations in the justifying comments in the private PE. First, the comments written on the private PE tended to be longer than the ones written in the public PE. Many participants filled up the space provided. Secondly, regarding the content, they detailed events or explained certain situations such as lateness. These events were used to modify the PE score and to

inform the teacher. Thirdly, the comments were most often based on the evaluation criteria. However, many commented according to what is relevant to the students, hence the explanation of certain events, the level of efforts, comments regarding the level of English. Lastly, by the second private PE, the number of comments decreased by nine percent. The comments were shorter, sometimes summative, and there were fewer events described.

The SA comments were a bit more reflective. Although, all participants justified the PE scores given to their peers, 16% of participants omitted to write their SA. One of the three teams with high ZPD in the other category commented about specific task and leadership roles assigned to or volunteered. As for the three teams with low ZPD, one team identified a leader. There was no other comment to describe further how the ZPD helped or hindered the group.

4.5.3 Participants' Comments Justifying the Public Peer Evaluation Scores

The number of occurrences increased from the first public PE to the second public PE, from 92 to 111. Table 24 below shows the distribution in percentage.

Table 24
Categories and Distribution of Participants' Justifications for the Public Peer Evaluations Scores

Categories	**Distribution for 1st Public PE**	**Distribution for 2nd Public PE**
Attendances and punctuality	25%	6%
Meaningfulness of contribution	28%	20%
Meet deadlines	9%	16%
Quality of the work	20%	20%
Attitudes	13%	21%
Other comments	7%	17%
Total	100%	100%

Table 24 shows the distribution of comments remained the same in the category *quality of the work* at 20%. *Attendance and punctuality* were less present in the second public PE justifying comments. Perhaps these issues were resolved or became less important by the second public PE. As for the *meaningfulness of contribution* category, its percentage was decreased by eight percent. Perhaps, by second round, teams had a sense of each other's contribution. The category of *attitude* increased by 7%. Lastly, in the other comment category, participants wrote who accomplished specific task without elaborating on them; they identified leadership or coordinating roles in the team. These roles were not qualified, as it "good or poor leader". It simply acknowledges that the student was the leader.

4.5.4 Observations Unique to the Public Peer Evaluations' Justifying Comments

In comparison to the private PE's comments, the comments were much shorter. It demonstrated the main comments the team agreed upon. From the first public PE to the second public PE, there were fewer comments regarding specific events.

There were three groups with high ZPD. When comparing the categories of comments, they all wrote comments about *attitude* in the second public PE. They had no common categories in the first public PE. As for the three teams with the lowest ZPD, there were more comments regarding multiple categories. The common categories in the first public PE are *attitude* and *quality of work*. As for the second public PE, the common categories are *meeting deadlines* and *attitude.* The majority of comments were positive in both rounds.

4.6 Other Comments from the Exit Survey

At the end of the exit survey, participants had a chance to write additional comments regarding the study. Forty-two participants had no additional comments and the remaining eight wrote comments regarding their experience in the study. They were generally positive, although one participant found the process complicated. See Appendix P for the list of comments.

5. ANALYSIS

The following section further reflects on the results presented in this chapter.

5.1 Benefits and Drawbacks of Peer Evaluations

Approximately half of the sample preferred the private PE. The main benefit identified and the main reason for preferring this PE was *honesty, r*egardless of the variables studied. However, when it comes to *team reflection* as a benefit of private PE, only weak or average junior males identified it. These males belonged to teams 9, 11, and 12. Teams 9 and 12 had limited ZPD and team 11 was all male with a fair distribution of AP (one weak, one strong, and two average students). Perhaps the limited ZDP forced the individuals to reflect on their team. Limited ZDP may have created tensions or fostered mentorship relationships between the weak and the strong in AP students.

Interestingly, *getting revenge* is the sole concern of junior weak in AP students at 37%. Perhaps, weak in AP students sensed they were more at risk of retaliation from their peers, or they may have used the private PE to "even the scores" among the members to compensate for their weakness. When analyzing their group's composition, all occurrences are spread across four teams (out of 13). Three of these teams have a high ZDP. In a junior group composed of one strong, one average, and two weak in AP students, the weak in AP participants were concerned that others

may lie about their contribution or lie because they did not like the person. In a junior group with three weak in AP participants and one strong in AP student, two of the three weak in AP students wrote comments about "*bringing other's grade down*" or "*holding something against them"* if they do not like them. As well, in an all senior female groups, two weak in AP members wrote comments about *getting revenge.* They wrote that conflicts and personal negative comments might have resulted in assigning poor scores to others. These groups were most likely experienced tension between the strong and the weak in AP students, instead of a mentorship-like relationship.

As for the public PE, one-third of participants listed peer feedback as the main benefit regardless of the variables studied. The second place was a tie between improve the team performance and opportunity to defend. Strong in AP students saw reaching an agreement/maintaining peace as the main benefit, more than average and weak students. Fairness is slightly more relevant to male strong in AP students with 15% as opposed to 7% for female participants. The following comment from a junior male strong in AP participant reflects that point "no member gets a bad grade without at least being able to defend themselves". The relationship seems to be a key influencing factor in the drawback of public PE. Participants, for various reasons, were concerned with potential conflicts; they hid information, found it unpleasant to give feedback and limited the number of bad PE scores. The possibility of conflict was the main drawback for at least one-third of the participants, regardless of variables studied. Strong in AP students tended to hide information and limit conflict at 29% respectively. A senior male student strong in AP wrote: "The members may avoid serious discussion in an attempt to avoid conflict, especially when there is another case to do after the first evaluation. It may be in the spirit of preserving the relationship that they built with their peers over their three years of study and the fact that they have to keep working with one another for the duration of their studies. Regarding hiding information, a strong senior male also wrote, "lots of opinions are

not said because of not wanting to hurt another individual." The idea of protecting the relationship is important again.

As for students weak and average in AP, they were more concerned with potential conflicts at 38% and 41% respectively. When examining the composition of the group, members of two out of the three groups limited ZPD were concerned with conflicts. The students weak in AP in these groups wrote comments regarding potential problems between peers, animosity, and tension among the members. Limited mentoring occurred in this group between the weak and the strong in AP students.

There is a large amount of inconsistent and unclear answers across all variables. Three participants left the space empty, and six wrote comments that were unclear or inconsistent with the question. For example, two junior males wrote concerning the private PE might have been seen by others. It shows a poor understanding of private PE. It may be explained by their limited experience in PE since junior students would have completed about five group projects at the college level. Not all group projects are subject to PE. Two others junior students wrote that it was time-consuming. However, during the experiment, participants were assigned much more time to complete the public PE, in comparison to the private PE. Perhaps, their lack of experience made them undervalue this activity. Considering the private PE is solely based on one's individual input, participants recognised they lacked feedback to improve themselves. Some insinuated they cannot "know or verify" what others are saying, indicating a potential mistrust.

5.2 Participants' Impressions of the Public Peer Evaluation

Three questions on the exit survey gathered data on the participants' impressions of the public PE: (1) public PE reflecting the participant's actual contribution to the group-based project, (2) the participant's ability to present and

defend position in the public PE, (3) the process allowed the participant to reflect on one's role and contribution to the group.

Regardless of the variables studied, over 70% of participants agreed they were able to defend their position during the public PE and it reflected their actual contribution. Therefore, participants trust their individual abilities in communicating their points and the outcome of the public PE. Considering the sample comes from a highly culturally diverse population, the participants with weaker communication skills in English did not believe they were at a disadvantage.

As well, for approximately 70% of participants, regardless of the variable studied, this process offered an opportunity to learn about themselves. They have learned various life lessons. Participants have learned to manage relationships in a group while reflecting on their individual contribution and role. A senior male strong in AP wrote to that effect that *"the documented feedback on the paper written individually caused me to reflect because it was a confidential evaluation. The group evaluation was less reflective because I felt we were just trying to reach agreement"*.

5.3 Impacts of Peer Evaluations on Individual Grades

As PE scores may be used to modify student's individual grade for the group-based project, and analysis of its impact was done. Overall, the study revealed that AP was the most influential variable on the PE scores. The public PE benefited the weaker students, and the private PE favoured the average and strong students. As for gender, the first public PE advantaged the male participants more, while females obtained better scores on the second private PE. On the first round of PE, students tended have lower PE score on the public PE, and better scores on the private PE. The second round of public PE tended to benefit weak in AP students the most. By the second round of PE more students obtained similar scores on both PEs.

5.4 Self-assessments Throughout the Peer Evaluations

More than two third of participants, regardless of gender, overvalued their contribution to the team throughout the process. When it comes to gender, male participants are in greater proportion than female participants in this category. The academic profiles analysis was a bit more revealing as the number of weak students who undervalued their contribution increased throughout the process. Most average and strong students overvalued their contribution. Lastly, when it comes to the year of study, a larger proportion of senior students undervalued their contribution compared to junior students. Regardless of the variable, SA is overvalued throughout the process. Perhaps this is unique to Business students.

The process probably made them more critical of their performance and/or allowed female participants to understand best where they stood and how the group perceived them. Alternatively, female participants made more compromises by the second public PE, even if their self-image is different in private PEs. Overall, females remained confident in their SA as more than two third of females overvalued or gave a similar score throughout all PEs.

Weak in AP students somewhat lost confidence in their SA throughout the four PEs, as the number of students who undervalued themselves increased and the number who overvalued themselves decreased. Therefore, a large portion of average in AP students remained more confident than weak students in their SA. The strong in AP students showed a similar patterned to the average students. The following first SA of a senior male strong in AP illustrates this point: "*I have given myself the highest grade as I feel I gave the most to the project. I was responsible for the alternative, the explanations, editing of the entire project, answering questions and leading in our presentation. I out casted myself from the group at times as I felt superior as I better understood the material and this may have been seen as rude."*

5.5 Participants' Comments Justifying Peer Evaluation Scores

The study demonstrated that over 80% of the participants' comments written to justify the PE scores were positive on either PEs. The literature review revealed that students have difficulties expressing opposing views and prefer the teacher to intervene; students find it easier to evaluate technical or specific tasks. Some participants identified the tasks each participant did without comments on how up to standards or it was done or not. Some of the comments representing this point include: "*he completed the power points slides", "she was the leader".*

The literature mentioned that it is difficult for students to evaluate their friends. As identified in this study, relationship and friendship influence the PE. This may explain why more positive comments were written, even when the PE score was low. Furthermore, positive comments often accompanied negative comments. One of the drawbacks of the private PE is that it is difficult to evaluate. As students are learning the material, they may find it challenging to judge their peers. Their level of expertise in the subject to evaluate is minimal.

The comment analysis also revealed the participants' ethical dilemma. They recognized that some of their peers were very "active" or put in a lot of "effort". In those same lines, in the second round of PEs, some comments identified the improvement of their peers. For example, *"(participant's name) improved their power point slides on this case.*" Whether or not the level of activeness or effort met the team's standards or not was irrelevant. The comments revealed a desire for that peer to be recognised for trying or for working hard, even if the grade is for the final outcome of the group-based project.

According to Daniel Goldman's emotional intelligence theory (1995), students may have the empathy and be self-aware of their emotions and recognize how they may impact their peers. However, they may not have or be comfortable in

their social skills to manage others' emotions to accept negative feedback. Considering one of their motivations is the relationship and to obtain a good grade, students may be reluctant to write negative comments. If the teacher sees the "problems" that occurred in the team, every members' individual grade may be affected.

CHAPTER SIX
DISCUSSION AND CONCLUSIONS

This chapter will further interpret and explain the results presented earlier. It will provide an answer to the research question, and proposes recommendations for successful implementation of peer evaluation (PE). The findings will be presented in a meaningful context for teachers, especially Business teachers. Lastly, the limitations of this study, further avenues of research, and a concluding statement will be presented.

1. RESEARCH QUESTIONS CONCLUSIONS

1.1 First Research Question

The first research question was: Are there differences between the private PE and the public PE? Specially, what is the impact of these PE forms (private vs. public) on grades, student's self-beliefs and ability to self-assess? The quick answer is yes. The two PEs should not be seen as two mutually exclusive alternatives but two complementary solutions. As it will be recommended later on, they work well in tandem.

The sample came from a very ethnically and culturally diverse population. For some, English is their second if not third language of communication. However, they study revealed that nearly all students believed the public PE reflected their actual contribution to the group-based project and they had the ability to present and defend their position in the public PE. Therefore, among their peers, most of the sample's participants trusted themselves and their communication abilities to represent their interests in the group.

In the qualitative analysis, the main benefit identified for the private PE is honesty and its main disadvantage is hard to evaluate. All participants identified honesty as the main benefit and hard to evaluate for the private PE. Both genders identified peer feedback as the main benefit and conflict and hide information as the drawback of the public PE. When analysis the negative points of the public PE, all the answers revealed that it may potentially damage the relationships.

1.2 Second Research Question

The second research question was: How did these students respond to the different PE forms differ based on the following variables: gender, academic profile (AP), student's year of study.

1.2.1 Gender

When it comes to gender differences, the study concluded a limited number of meaningful differences between the PEs. Regarding the self-assessment (SA) analysis, female participants accounted for or integrated some of the feedback, from the first round of PE. Their SA was more in line with their teammates. As for male participants, they tended to overvalue their contributions in both forms of PEs. Lastly, female participants obtained better grades on private PEs in comparison to the private PEs. That is, their peers awarded higher scores to female participants in the private PE compared to the public PE. On the other hand, male participants are not at a major disadvantage in either PEs.

1.2.2 Academic Profile

The AP analysis revealed several meaningful conclusions that teacher must consider in choosing a PE. Overall, a greater number weak in AP students somewhat lost confidence in their SA throughout the four PEs, as the number of students who undervalued themselves increased from the first round of PEs to the second round of PEs. However, a large portion of average in AP students remained more confident than weak in AP students in their SA. Most strong in AP students overvalued their contribution through all PEs.

When it comes to the impact of the PEs on the individual grade, average and weak in AP students are at an advantage on the second round PEs, especially the second public PE. Unfortunately, that is not the case for strong in AP students, where they obtain better scores in private PEs.

In the qualitative analysis, weak and average in AP students identified the main disadvantage of the private PE as hard to evaluate. The strong in AP students, however, said the lack of peer feedback for strong in AP student. Interestingly, only weak in AP students were concerned with their peers getting revenge on them in the private PE.

1.2.3 Year of Study

The year of study analysis revealed the least number of meaningful conclusions. Senior students considered the outcomes of their first SA much more than junior students in their second SA.

2. RECOMMENDATIONS

The private (PE) offered a student feedback free from the relationship or group cohesiveness constraints. A participant wrote the following: "*the documented feedback on the paper written individually caused me to reflect because it was a confidential evaluation. The group evaluation was less reflective because I felt we were just trying to reach agreement"*, said a senior male strong in (AP). The public PE offered an opportunity to share this feedback, however, many concerns revolved around relationship issues, such as conflict, unpleasantness to give feedback, and hiding information. Are the students missing out on peer feedback at the expense of maintaining peace in the group or in relationships? Developing relationships is one of the cornerstones of Business. Perhaps the public PE builds these skills.

The goal of the public PE is to provide feedback openly and to improve the team's performance. Some of the main influences in the public PE discussion are relationships and personalities. The following quote illustrates just that: "*I tended to evaluate myself just on the work stuff, whereas my group members took it into account my responsibilities outside of work and gave me a better mark. They said I am too hard on myself"* (senior female strong in AP student). Some students, unlike employers, factored in the peer's life and personality, even if it is not part of the five evaluation criteria (attendance and punctuality, meaningfulness of the contribution, meeting deadlines, quality of the work, and attitude). In the previous quote, it was a positive outcome. This next quote came from a senior male student weak in AP "*I*

learned that not everyone has the same personalities and cultures, which can impact on the grading process". It supports the fact that students considered other factors besides the one listed in the PEs. This is consistent with the development phase the student is in. Although the students were trained to evaluate their peers on the most irritable areas of working in group, the relationship they share and personality traits are among the items that influenced their evaluations.

Evaluating peers is a skill that improves with time. Therefore, as identified in the literature, repetition is an important part of the learning. To fully grasp the benefits of either PEs, this assessment should be practiced at least twice in a course. Formative PEs should be encouraged. It will avoid extremely high or low grades and will allow students to adjust themselves in the teams. Students will better understand the dynamics of their teams, learn more about themselves, and will use this valuable knowledge to improve their current group-based assignment during the course. One of the favoured strategies may be to complete a first round of private and public PEs after the first milestone or midway through the high stake group-based assessment, and a private PE at the end of the team-based project, and before returning the project's grade and comments. Average and strong in AP students will be better represented in private PE, and the weak in AP students will have an opportunity to know which area to improve on, giving them a chance to improve their contribution or at least the perception of their contribution.

Therefore, for a semester-long project with milestones, or for assessments where students work with the same group, it will be important to allow time for an initial public PE to allow the group to work out differences, regardless if these differences are concerning team dynamic, performance, personality conflict, etc. It may be graded as a bonus point to entice students to complete the tasks. Female students and weak in AP students will be less penalized overall.

The PE questionnaire plays a key role in the success of this constructive learnings strategy. As the literature and this study demonstrated, teachers should explain clearly the criteria of the PE. This study demonstrated that stressing the use and purpose of the PE is crucial, especially with junior students. The literature also stressed the simplicity of the form. That was also assessed in this study, where very few students said it was complicated or time-consuming. Complex forms may invite students to lie or to skip some sections.

Teachers should be aware of the role needed in a team for successful group work. These functions include motivator, devil's advocate, leader/coordinator, etc. Students can refer to them and may evaluate peers according to the role they play. Some tasks are more demanding or apparent, such as leadership or coordinator role. Editing is done in the background, and other may not see it. Therefore, the coordinator may appear as if they are contributing more because they are in contact with all members. As for editors, their contribution is not as visible to all members, unless it is pinpointed.

PE scores have to be scrutinized by the teacher. The literature revealed there is an assumption that students tell the truth in PEs. This study demonstrated that participants found various drawbacks for each PEs that may influence the PE scores. Both PEs provided insights on the team's process but did not fully reveal the hidden motivations behind each score. The study showed the private PE may invite students to get revenge on their peer. Public PE may lead to no bad grade, and hidden information. Hopefully, by creating a simple PE form, offering training and practice, the reliability of the PE score will increase.

For Business teachers who grade the outcome of a group-based project, and not the process, they should be aware of it and inform students. As identified in the justifying comments of PE scores analysis, many participants wrote comments based on effort, the level of activity, and time spent – whether or not the task was completed

up to standard. The level of activity, time and effort seem to be important to the participants, even if a team did not obtain additional points on the assignment for these items.

The research design allowed the experience to be repeated twice: first round and second round of PE. This design provided evaluating experience to the students to familiarise themselves with the process and the form.

Lastly, particular attention is required towards the group formation. The literature demonstrated that when left on their own, strong in AP students will group together, leaving the weaker students on their own. On the other hand, in this study, randomness did not always favour the most cohesion in the teams. Considering the population sampled, ZPD played a role, most likely as much as relationships, in the team. Weaker members in groups with no ZPD were concerned more with conflicts and tensions. These concerns may skew the peer evaluation (PE) process and score. Therefore, a combination of randomness and pre-selection may combine the benefit of both strategies.

3. LIMITATIONS OF THE STUDY

This study contained certain limitations and weaknesses. First, the format of the PE forced students to divide the "entire pie" among all members. For a team of four students, they had 400 points to divide among the team. However, some participants believed all members of the team underperformed, therefore, no member should receive a PE score equal or above 100. The format forced students to rank the performance of their peers, which might have influenced the PE score.

Second, the private PE was completed prior to the public PE and on the same day. Although the PE was announced ahead of time, and scheduled in the course, one participant pointed out he/she lacked time to reflect on the evaluation. Additional

time might better prepare students to effectively share their feedback in a constructive matter in the public PE.

Third, although most completed all questionnaires and survey, the perfect sample of 50 participants was small to conduct a strong statistical analysis. In the same line, students frequent the same courses. By their senior year, they know each other. Maturity levels, moral development, the importance of group and friendships may influence results in PEs. The students know the weak and the strong one among them; they may have learned that some weak in AP students will not change, whether they mentioned it in PEs. Therefore, they may be reluctant to share certain feedback. Junior students know they will spend a minimum of three years with the same students; they will work on many more group-based projects. Therefore, building friendship/relationship is essential to succeeding in their program.

Lastly, the group-based assignments were designed to increase collaborative learning. However, as it is a custom in Business for teams to divide the work into smaller parts, prepare their parts individually, and meet prior to the deadline to piece the parts together. For one group in particular, the first public PE stated that half of the members worked on the first group-based project only and the other half worked on the second group-based project only. It was their agreement that half of the team was to work on the first group assignment, while the second half of the team worked on the second group project. These larger scores skewed the PEs.

4. AVENUES OF STUDIES

One of the interesting areas of study to further explore would be to analyze the decision-making process of the participants. Considering their age and the importance of peers in their lives, how did the participants make the decision to evaluate their peers? What were the importance or role of friendship, peer pressure, and personalities? What is the decision-making process in a public PE and how does it

differ from the private PE? The study revealed the private PE offer an opportunity to skew the reality in one's favour or to take revenge of a peer. A further analysis of the underlining motives for scores in private PE and public PE may be of value. From those results, how can the class setting ensure the motives remain true to the purpose of the PE.

One of the objectives of the public PE is to prepare Business students to communicate essential feedback to improve the performance of the team. Is the public PE developing these Business communication skills, considering students will be working in a highly diverse work environment? This sample was ethnically highly diverse. Although some students completed most of their studies in Canadian institutions, some of the students had studied abroad. Working and studying with peers differs. The notion of plagiarism, sharing, and dividing tasks changes. One participant wrote: "*I learned that not everyone have the same personalities and cultures, which can impact on the grading process"*. This participant noticed the impact of personalities and culture in the PE process. Therefore, with Canadian institutions becoming more and more diverse, how are group-based projects evolving and how is this impacting PE.

5. CLOSING STATEMENT

Evaluating colleagues and other team members is an important Business skill to develop. This masters paper compared two forms of PEs used to develop such skill. The study was based on three variables: gender, academic profile, and year of study. Just as in the literature review, the study demonstrated learning to evaluate others is an ability that takes time to develop and master. College level Business students are busy with work and other personal responsibilities. Many peers consider these responsibilities in their PE, even if they are not part of the evaluation criteria. They will also consider the lasting consequences, such as potential conflict, of their PE.

Although college level Business students may not master evaluating skills, the peer feedback provided in the public PE is nonetheless meaningful. Students better understand their PE score and the possible impacts on their individual grade for the group-based project.

The differences identified in the study are important for teachers to know and understand as they will have an impact on the student's individual grades. As it was recommended, the use of both PE provides the best result, for the teacher and the students. As Business schools become more and more competitive, grades become more important for the students' future studies in the field.

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GLOSSARY

Academic profile (AP) – Refers to the participant's individual performance in their respective course. There are three possible outcomes: weak, average, and strong.

Average AP – Average students are identified through their individual grades obtained in the course. Average students are within the standard deviation of the class average.

Group or team – Refers to students working together towards a common goal or assignment. In this study, three to five students form a team or group.

Group-based or team-based project or assignment – Completed outside of class time, each team works together on high stake assignments. These collaborative group-based projects involve external research on different topics.

Junior – Refers to students who completed one and two years of study in the program.

Peer evaluation (PE) – In the form of questionnaires, students evaluate their team members according to various criteria: punctuality and attendance, meaningfulness of contribution, on-time completion of tasks, quality of the work, and attitude. This evaluation is qualitative and quantitative.

Peer evaluation score (PE score) – Refers to the numerical evaluation of the peer evaluation. In this study, it ranges between 50 and 150.

Private peer evaluation or private PE – PEs completed individually and confidentially. Students write their names and submit them to the teacher. Only the teacher/researcher has access to these private PEs. They are not share with the other students in the team. It will have qualitative and quantitative content.
Peer feedback – Refers to the comments exchanged by peers during the peer evaluation process.

Public peer evaluation or public PE – Students discuss each other's contributions to the group-based projects. Members of the group reach a consensus on each member's contribution. It will have qualitative and quantitative content.

Self-assessment – MacDonald quoted Bond's (1995) definition for self-assessment will be used in this research. Self-assessment refers to the "involvement of students in identifying standards and/or criteria to apply to their work and making judgements about the extent to which they have met these criteria and standards". Students reflect on their role and contribution in the team based on the same criteria as their teammates.

Senior – Refers to students who completed three or four years of study in the program.

Strong AP – Strong students are identified through their individual grades. They obtained a grade for the course that is higher than the average. Their grades are above the standard deviation of the class' average.

Year of Study – Refers to the number of years of study the student completed in the program. They are categorised as junior and senior.

Weak academic profile – Weak students are identified through their individual grade for the course. They obtained a grade lower than the average of the class for the course. Their grades are below the standard deviation of the class' average.

APPENDICES

APPENDIX A
PRIVATE PEER EVALUATION INSTRUCTIONS AND QUESTIONNAIRE

Private peer evaluation – worth 1%

Name:_____ Group #_____ Course: _____

Write the name of each group member, including yourself. Evaluate the peer's performance base on the five following criteria:

- **Attendance and punctuality**: The member attended regularly the meeting, arrived on time, and stayed for the duration of the meeting (on-line or in person).
- **Meaningfulness of the contribution**: During and outside of meetings, the member actively participated to the brainstorm, discussions, and decisions. He or she expressed how they can participate and volunteer for tasks.
- **Meeting deadlines:** The member completes group tasks on time tasks, research, and assignments are prepared within the deadlines.
- **Quality of the work**: The member's work met group standards, was sufficient; the information was properly referenced and did not need to be redone by another member; the work was appropriately divided and assigned
- **Attitude**: The member used proper communication (returning phone calls and/e-mail/text, contributed to the discussion forum). The member had a positive and constructive attitude toward the group, respected others, was cooperative, and respect of any rules established by the group. Demonstrates cooperation, respect, positive and constructive attitude.

For each group member, indicate the degree to which you agree with the statements on the left, using the following scale:
0 =failed, 1= pass, 2=below expectations, 3 = meet expectations, 4 =exceeded expectations

Evaluation Criteria	Group member:	Group member:	Group member:	Group member:	Evaluate yourself
Attendances and punctuality					
Meaningfulness of the contribution					
Meeting deadlines					
Quality of the work					
Attitude					
Total:					

Now that you evaluated your peers, it is time to grade them. Here is how the peer evaluation will affect the individual grade. In a group of 5 students, if all members contribute equally, they each get 100 points. For example, if the group's grade is for the application question is 78%, if each student will get 78% for the application question. Therefore, group peer evaluation form and the individual's grade will be calculated as follow:

Name	Individual contribution	Group grade	Individual grade
Samantha Fox	100	78	78
Madonna	100	78	78
David Bowe	100	78	78
Michael Jackson	100	78	78
Tina Turner	100	78	78
Total points	500		

However, if one student receives 115 points, he/she would receive 115% of the group grade, i.e. 89,7%. If one student gets more than 100 points, another student must receive than 100 points. Therefore, in a team where not all members contributed equally, the group peer evaluation form and the individual grade may look as follow:

Name	Individual contribution	Group grade	Individual grade
Samantha Fox	100	78	78
Madonna	115	78	89,7
David Bowe	85	78	66,3
Michael Jackson	105	78	81,9
Tina Turner	95	78	74,1
Total points	500		

Assign a number grade to each of your group member. Total points: If you have 4 members on your team, the total point is equal to 400; if you have 5 members on your team, the total point is equal to 500.

Group member's name						
Individual contribution						Total points:

For every member, explain the score.

Comments justifying the grade:

Group member name:

Group member name:

Group member name:

Group member name:

Group member name:

APPENDIX B
PUBLIC PEER EVALUATION INSTRUCTIONS AND QUESTIONNAIRE

Public Peer Evaluation – worth 2% once all members sign

Group number:_____ Course:_____

Write the name of each group member, including yourself. Evaluate the peer's performance base on the five following criteria:

- **Attendance and punctuality**: The member attended regularly the meeting, arrived on time, and stayed for the duration of the meeting (on-line or in person).
- **Meaningfulness of the contribution**: During and outside of meetings, the member actively participated to the brainstorm, discussions, and decisions. He or she expressed how they can participate and volunteer for tasks.
- **Meeting deadlines:** The member completes group tasks on time tasks, research, and assignments are prepared within the deadlines.
- **Quality of the work**: The member's work met group standards, was sufficient; the information was properly referenced and did not need to be redone by another member; the work was appropriately divided and assigned
- **Attitude**: The member used proper communication (returning phone calls and/e-mail/text, contributed to the discussion forum). The member had a positive and constructive attitude toward the group, respected others, was cooperative, and respect of any rules established by the group. Demonstrates cooperation, respect, positive and constructive attitude.

For each group member, indicate the degree to which you agree with the statements on the left, using the following scale:
0 =failed, 1= pass, 2=below expectations, 3 = meet expectations, 4 =exceeded expectations

Evaluation Criteria	Group member:	Group member:	Group member:	Group member:	Evaluate yourself
Attendances and punctuality					
Meaningfulness of the contribution					
Meeting deadlines					
Quality of the work					
Attitude					
Total:					

Assign a number grade to each of your group member. Total points: If you have 4 members on your team, the total point is equal to 400; if you have 5 members on your team, the total point is equal to 500

Group member's name						
Overall individual score						Total points:

Comments justifying the grade:

Group member name:

_____

_____

_____

_____

_____

Group member name:

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Group member name:

Group member name:

Group member name:

Signatures confirming each member's consent

Student printed name	Signature	Date
Student printed name	Signature	Date
Student printed name	Signature	Date
Student printed name	Signature	Date
Student printed name	Signature	Date

APPENDIX C
CONSENT FORM APPROVED BY DAWSON COLLEGE RESEARCH BOARD AND ETHICS'

INFORMATION SHEET

Comparative Study on Private and Public Peer Evaluations on Business Students at the College Level
Research by Fabienne Cyrius, Université de Sherbrooke and Dawson, Fall 2013

Version française disponible sous demande

Introduction:

Your teacher, Ms. Fabienne Cyrius, is also a researcher, completing a Masters in Education with Universtité de Sherbrooke. This document informs you of the nature, purposes, methodology, timeline of this study, but most importantly, to inform you of the risks and benefits for you to participate in this study.

- Your participation is voluntary, and greatly appreciated!
- Participants in the study will have the same workload as those opting-out of the study.
- No penalties, differential treatment, or exclusion will apply if you wish to opt-out of this study. No additional or bonus work or grades is awarded to participants.
- Your teacher will only know the name of the participants once your course has ended and the grades have been submitted to Dawson College.
- Prof. Elizabeth Charles, from Dawson College, supervises this research. No funds are allocated to this research. Dawson College and Université de Sherbrooke also support it.

Research Purpose:

Peer evaluations are commonly used in Business studies to identify and understand each team member's contribution to the group projects completed outside of class time. Currently, more and more teachers are using peer evaluations completed in-group after reaching a consensus, instead of individual and confidential peer evaluations. The objective of this research is to learn the similarities and differences between the peer evaluations completed individually and confidentially versus the peer evaluations completed in-group after reaching a consensus. Variables to be studied will be gender differences in self-assessment, and similarities and differences between both methods.

Research Method/Procedure:

1. After the project's presentation, groups of four to five students will be formed randomly.
2. After your first oral, each student (participants and non-participants to the study) will complete an individual and confidential peer evaluation. This document will be submitted to your teacher and is worth one point. Shortly after, you will complete a peer evaluation with your group after reaching a consensus. Together, you evaluate each other's contribution to the first group oral presentation. Once all members signed the evaluation, you will receive one point.

3. After your second oral, the process will repeat again. All students will first complete an individual and confidential peer evaluation and submit it to your teacher for one point. You will then complete a second peer evaluation with your group. This signed peer evaluation completed in-group is worth two points. The overall score for each member on this second peer evaluation completed in-group will most likely modify your individual grade for your term group assignments.
4. In the last week of your term you will complete a questionnaire on your experience regarding the peer evaluation. It will ask questions about the number of group term projects you completed in previous courses, your preferred peer evaluation method, your gender, age, and program, and your overall experience of the peer evaluation process. Once completed, Ms. Audrey Juhasz, a teacher in the Mathematics department at Dawson College, will collect the questionnaires. They will be kept in a sealed envelope until the end of your course and the grade are submitted to Dawson College (January 2014). The same will apply for this consent form.
5. In January 2014, the sealed envelopes containing the consent forms will be opened. Only the peer evaluations of the participants will be analysed further for this research. As for the peer evaluations completed in-group, only the data of the participants will be considered for this research. The completed questionnaires of the non-participants will be isolated and removed from this study's analysis then shredded, by Ms. Audrey Juhasz.

Benefits:

- You will obtain immediate feedback on how your peers view and evaluate your contribution to group term project.
- It is opportunity to improve your team working skills and to meet your desired objectives.
- You will have a chance to discuss each other's performance in person. This is a chance to improve your team dynamic, seek guidance from your teacher.
- You will improve your negotiation skills, your ability to effectively communicate and defend your positions. These are long lasting skills necessary for your upcoming career.

Risks:

- When giving and receiving feedback, some negative emotions may arise, just like when you receive feedback from your teacher. To minimize these negative emotions, you will be trained on peer evaluation. Remember, your teacher is available for guidance.
- Keep in mind the content of the questionnaire remains sealed until your grade is sent to Dawson College, therefore it cannot be used against you (participants and non-participants).

Confidentiality:

- This consent form and the questionnaire will be collected by a third party (Ms. Audrey Juhasz) and kept in a sealed envelope until the end of the course and the grades for this course are sent to Dawson College.
- Your information remains private and confidential. Furthermore, no name or student

identification numbers will be used in the final report of this study. Results will be presented on a statistical base, as a hole, and will remain anonymous.

Use of Data and Findings:

At the end of the study, the teacher/researcher keeps all documents in her locked office in sealed envelops, in a locked cabinet file for five years after the submission of the final report to Université de Sherbrooke. Only the teachers Ms. Fabienne Cyrius and Ms. Audrey Juhasz, the research supervisor Prof. Elizabeth Charles, Dawson College Research and Ethic Board, and Université de Sherbrooke graduate research committee in the education faculty will have access to these data, upon request. The data may be reviewed to validate the findings and conclusions stated in the final report. After five years, the data will be shredded. In the report, participant's personal name or student identification numbers are not mentioned. The data is presented as a hole, statistically and qualitatively. If specific quote is mentioned, the source remains anonymous. The data will not be used in other research.

Participant Rights:

- At any given time, you are encouraged to ask questions regarding all aspects of the research.
- Contact your teacher at xxxxx, or at xxxxx, or drop by office 4H.11.
- Throughout the semester, you may opt out of the study, if you desired.

Support Professional(s) External to Project:

You may contact the following people:

- For research question: Professor Charles, research supervisor: xxxxx
- For the researcher's assistant: Ms Audrey Juhasz at xxxxx
- For confidential counselling services to discuss stressful issues, visit 2D.2.
- For mistreatment by the researcher or your peers, see the ombudperson Ms. Michele Pallett, xxxxx, xxxxx local 1191, office 2E.

Thank you!

Thank you for considering participating in this research. If you have any question, please contact your teacher, Ms. Fabienne Cyrius. Once you made your decision, complete the last page and return it the sealed envelop provided. Ms. Audrey Juhasz will be present to collect the form.

Your contribution will play a valuable role in understanding and improving the peer evaluations methods at the CEGEP level.

Consent Form for Students

Dawson College Research Ethics Board Information

Statement of Consent

I, _____ (student name) certify that I have read the above information, understand the risks, benefits, responsibilities and conditions of participation as outlined in this document, and freely consent to participate in the comparison study on peer evaluations completed individually and confidentially versus peer evaluations completed in-group after reaching a consensus, at the college level.

_____ _____

Signature Date

I would like to receive an emailed copy of the research upon its completion. Please email a copy
to: _____(write your email address)

Statement of Parental/Guardian Consent

(for participants under the age of 18 years)

I certify that I am the legal parent or guardian for _____ _____ (student's name) born _____ (date of birth). I certify that I have read the above information, understand the risks, benefits, responsibilities and conditions of participation as outlined in this document, and freely consent to _____'s (student's name) participation in the comparison study on peer evaluations completed individually and confidentially versus peer evaluations completed in-group after reaching a consensus, at the college level.

_____ _____ _____

Parental/Guardian printed name Signature Date

I would like to receive an emailed copy of the research upon its completion. Please email a copy
to: _____(write your email address)

Statement to opt-out of the study

I do not wish to participate in study as it is described in this document and was presented.

_____ _____

Signature Date

APPENDIX D
EXIT SURVEY

EXIT SURVEY

Comparative Study on Private and Public Peer Evaluations on Business Students at the College Level

Research by Fabienne Cyrius, Université de Sherbrooke and Dawson College, Fall 2013

Please answer the following questions. Once completed, insert your questionnaire in the sealed envelope provided.

1. Your name: _____

2. Circle your gender Male Female

3. Circle your program
   a. Accounting – 3 year technical program
   b. Marketing – 3 year technical program
   c. 2 year pre-university. Which one?_____
   d. Other. Specify: _____

4. What year of study are you in? Circle your answer.
   1 2 3 4 +

5. How many term or semester long group projects (Business and non Business related course) have you completed at CEGEP level prior to this course. Circle your answer.
   1 to 5 6 to 10 11 to 15 16 to 20 21 to 25 26 to 30

6. Name one benefit and one drawback of the peer evaluation completed individually and confidentially.

   Benefit: _____

   _____

   _____

   Drawback: _____

   _____

   _____

   _____

7. Name one benefit and one drawback of the peer evaluation completed in group.

Benefit: _____

_____

Drawback: _____

_____

8. The peer evaluation completed in-group reflected my actual contribution to the group project. Circle the best answer.

I strongly agree I agree I am indifferent I disagree I strongly disagree.

9. I was able to present and defend my position during the peer evaluation completed in-group. Circle the best answer

I strongly agree I agree I am indifferent I disagree I strongly disagree.

10. Did the process allow you to reflect back on your role and contribution to the group? Justify. _____

_____

_____

11. Which peer evaluation process did you prefer? Circle your answer.

Peer evaluation completed individually and confidentially

Peer evaluation completed in group after reaching a consensus

Why? _____

_____

_____

12. Other comments: _____

_____

_____

Once completed, return the questionnaire in the sealed envelope provided.

APPENDIX E

APPROVAL LETTERS FROM DAWSON COLLEGE RESEARCH AND ETHIC BOARD

APPROVAL LETTERS FROM DAWSON COLLEGE RESEARCH AND ETHIC BOARD

Research Ethics Board
3040 Sherbrooke St. West
Montreal, Quebec
H3Z 1A4 Canada
Tel: 514 931 8731
Fax: 514 931 6097

www.dawsoncollege.qc.ca

17 June 2013

Fabienne Cyrius, Faculty
Business and Administration
Dawson College
3040 Sherbrooke Street West
Montreal, Quebec
H3Z 1A4 Canada

Project Title:	Comparison study on peer evaluations completed individually and confidentially versus peer evaluations completed in-group after reaching a consensus, at the college level
Principal Investigator:	Fabienne Cyrius
Collaborators:	Elizabeth Charles (Dawson College), Rosario Loraso (Dawson College)

Dear Ms. Cyrius,

Thank you for the recent application for ethics approval presented to the Research Ethics Board (REB) at Dawson College. The REB has granted your project **conditional ethics approval**.

Before you begin to conduct this research at Dawson College the REB asks that your project meet the following conditions.

1. **Consent form:**
    a. **Clarity**: In the introduction paragraph 2, please replace "once the semester ends" with "once your course has ended and the grades have been submitted to Dawson College" (consistent with Research Methods/Procedure, par. 3).
    b. **Benefits and risks of participation**: Explain the potential risks in receiving and giving feedback to peers, such as the emotions that might arise, and explain the steps the teacher will take to reduce these risks (group contract, feedback training, and availability of teacher guidance).
    c. **Language Provision**: Either provide a French consent form for Dawson students or exclude native French speakers from the study. The rationale for this condition is that no matter how fluently bilingual a participant may be, in the case of consent to participate in research, the potential participant may understand the consent process better if it is provided in his/her native language. Since Dawson College is located in Quebec, it is reasonable to anticipate some participants may be native French speakers.
2. **Neutral Third Party**: A neutral person such as a teacher from outside the Business Administration program or a non-teaching, non-management staff person from the College, should be the one to recruit participants, answer their questions about participation in the study, and collect the consent forms. The rationale for this condition is to eliminate any perceived coercion to participate, from a person in a position of authority over the students grades and academic standing

3. **Data Storage**: The data collected during the study should be locked in a space that is only accessible to the researcher and the research team. If a shared office is used by the researcher, then locking the data in a secure space (such as a file cabinet) within the office would be necessary, not simply locking the data in the office.
4. **Ethics certificate from parent organization**: The University of Sherbrooke is the parent organization for this study. If formal ethics review through a research ethics committee at the University of Sherbrooke is not required of Master thesis students in the MTP program, then a letter from your thesis supervisor indicating that he/she has reviewed the study and deems it to meet research ethics requirements, would suffice.

Suggestions:

1. **Consent Statement:** You may wish to consider including the name of the person obtaining consent in the consent statement (*Consent Form for Students*, page 6) and to provide a space for this person to sign the form, in addition to the consent signature from the candidate for participation in the study.

Once the REB has received documentation satisfying these conditions, the REB will be able to grant full ethics approval to your research project.

Should you have any questions, please feel free to contact me by email
or by telephone, extension 1414.

Sincerely,

Julie Mooney
Chair, Research Ethics Board

APPENDIX F
LETTER OF SUPPORT FROM RESEARCH SUPERVISOR

LETTER OF SUPPORT FROM RESEARCH SUPERVISOR

To: Members of the Dawson College Research Ethics Committee
From: Elizabeth S. Charles
Subject: Fabienne Cyrius's request for REB permission

Date: August 28th, 2013

Writing on behalf of the Supervisors Committee of the Master Teacher Program (MTP), l'Université de Sherbrooke, this letter is to confirm that the Committee has accepted the research proposal of Ms. Fabienne Cyrius: *Comparison study on peer evaluations completed individually and confidentially versus peer evaluations completed in-group after reaching a consensus, at the college level*.

We have reviewed Ms. Cyrius' proposal and verified that her research methods conform to the ethical standards for research involving humans, established by the Tri Council Policy Statement. We wish her success in carrying out her research, as she works toward the completion of her MTP degree.

Sincerely,

Dr. Elizabeth S. Charles, Ph.D.

APPENDIX G
DAWSON COLLEGE RESEARCH ETHICS BOARD CERTIFICATE

DAWSON COLLEGE RESEARCH ETHICS BOARD CERTIFICATE

Research Ethics Board
Dawson College
3040 Sherbrooke Street West
Westmount, QC H3Z 1A4

Tel: (514) 931-8731
Email: rebapply@dawsoncollege.qc.ca
Website: http://www.dawsoncollege.qc.ca/research-ethics-review

Dawson College Research Ethics Board
Certificate of Ethical Acceptability of Research Involving Humans

REB File #: 2012-13 31

Project Title: Comparison study on peer evaluations completed individually and confidentially versus peer evaluations completed in-group after reaching a consensus, at the college level

Principal Investigator: Fabienne Cyrius

Institution: Dawson College **Department:** Business and Administration

Co-Investigator, Collaborator: Elizabeth Charles, Audrey Juhasz

This project was reviewed by full board review.

Sacha Young, REB Chair

Approval Period: __ 05 March 2014 _____ to ____ 04 March 2015 __

The Research Ethics Board at Dawson College, mandated to provide approval for research projects involving humans, examined the aforementioned research project. This project was approved in accordance with the requirements of the Dawson College Policy on the Ethical Conduct of Research Involving Humans (2011) and with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (2010).

IMPORTANT

Renewal: All research involving human participants requires review on an annual basis. A request for renewal application form should be submitted at least 1 month before the above expiry date.

Closure: When a project has been completed or terminated a Study Closure form must be submitted.

Modification: Should any modification or other unanticipated development occur before the next required review, the REB must be informed and any modification must be approved prior to implementation.

APPENDIX H
BREAKDOWN OF THE SAMPLE'S GROUP ACCORDING TO VARIOUS VARIABLES

BREAKDOWN OF THE SAMPLE'S GROUP ACCORDING TO VARIOUS VARIABLES

Table 25
Breakdown of Sample according to Groups, Genders, and Programs

	Groups													
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**Total**
Marketing Male							1		1	1	3	1	1	8
Accounting Male	2		2	2	3	1	1	1	1	1	1	1	1	17
Marketing Female							2		2			1	1	6
Accounting Female	2	4	2	2	1	3		2		1		1	1	19
Total	4	4	4	4	4	4	4	3	4	3	4	4	4	50

Here are the patterns identified:

Pattern 1: There were three groups where the number of female equals the number of males and the students are from the same program (groups 1, 3, and 4).

Pattern 2: There were tow groups where the number of female equals the number of male, however, the programs are mixed (groups 7 and 9).

Pattern 3: There were two groups where the number of female equals the number of male and each student bellows to different program in equal proportion (groups 12 and 13).

Pattern 4: One group consisted of only female students all from the same program (group 2).

Pattern 5: One group consisted of all male participants, however they were from different programs (group 11).

Pattern 6: Two groups had an unequal number of female and male participants, however, the participants were from the same program (groups 5 and 6).

Pattern 7: Two groups had an unequal number of female and male participants and the participants were from different programs (groups 8 and 10).

Table 26
Breakdown of Sample According to Groups and Year of Study

	Groups													
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**Total**
Junior							4	3	4	3	4	4	4	26
Senior	4	4	4	4	4	4								24
Total	4	4	4	4	4	4	4	3	4	3	4	4	4	50

Here are the patterns identified when considering the year of study and gender:

Pattern 8: Three groups of an equal number of female and male participants were all senior students (groups 1, 3, and 4).

Pattern 9: There were four groups of an equal number of female and male participants and all junior students (groups 7, 9, 12, and 13).

Pattern 10: One group of all female participants were all senior students (group 2).

Pattern 11: One group of all male participants were all junior students (group 11).

Table 27
Breakdown of Sample According to Groups and Academic Profiles

	Groups													
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**Total**
Weak	1	2	1	2	1	2	2	1	3		1	1	2	19
Average	1	1	3	1	2	1	2			2	2		1	16
Strong	2	1		1	1	1		2	1	1	1	3	1	15
Total	4	4	4	4	4	4	4	3	4	3	4	4	4	50

Here are the patterns identified:

Pattern 12: Three groups had very limited or no ZPD (group 8, 9, and 12). The disparity between the number of strong and weak students is great.

Pattern 13: Three groups had a higher ZPD (groups 3, 7, and 10). The students in these groups were closer in academic profiles.

Pattern 14: Seven groups had mixed ZPD, as they have various academic profiles.

APPENDIX I

PARTICIPANTS' JUSTIFICATIONS TO THE QUESTIONS "DID THE PROCESS ALLOW YOU TO REFLECT BACK ON YOUR ROLE AND CONTRIBUTION TO THE GROUP" ACCORDING TO VARIABLES

PARTICIPANTS' JUSTIFICATIONS TO THE QUESTIONS "DID THE PROCESS ALLOW YOU TO REFLECT BACK ON YOUR ROLE AND CONTRIBUTION TO THE GROUP" ACCORDING TO VARIABLES

On the exit survey, question 10 asked participants whether the process allowed you to reflect back on your role and contribution to the group. The tables below show the detailed results according to gender, academic profiles, and year of study.

Table 28
Participants' Justifications to the Questions "Did the Process Allow You to Reflect Back on Your Role and Contribution to the Group" According to Genders

Categories	Female	Male
Self feedback	64%	72%
Group feedback	24%	21%
Unclear/ no answer	12%	7%
Total	100%	100%

The distribution between genders is relatively the same. Most respondents learned more about themselves. Therefore, this question is not influenced by gender.

Table 29
Participants' Justifications to the Questions "Did the Process Allow You to Reflect Back on Your Role and Contribution to the Group" According to Academic Profiles

Categories	Weak students	Average students	Strong students
Self feedback	74%	70%	56%
Group feedback	16%	18%	38%
Unclear/ no answer	10%	12%	6%
Total	100%	100%	100%

Table 20 shows that self-feedback is still the main feedback obtained. However, strong students learned more about their group during this process, in comparison to weak and average students. A strong junior male wrote "*we discussed and gave marks according to our respective contribution that are fair"*. As an example of self-feedback, a weak senior male learn "*that not everyone has the same personalities and cultures, which can impact on the grading process"*.

Justification:

The second part of the answer was a justification. Some answer landed in multiple categories and to added to 51, where 26 came from male and 25 from female participants. The answers were read and categorised as below:

- *Self-feedback* – Participants believed the process provided comments about themselves. Key words included *I, my strength/weakness.*
- *Group feedback* – Participants saw the process mainly outlined comments about the group. Key words included *group and we.*
- *Unclear/ no answer* – The answer provided was inconsistent with the question asked; the statement was unclear or misleading; or the space was left empty.

Table 30
Categories and Distribution of Justifications to the Questions "Did the Process Allow You to Reflect Back on Your Role and Contribution to the Group"

Categories	Distribution	Quotes representing the category
Self feedback	68%	*"…Group members often re-enforced my strengths and never had anything negative to say."* *"Because I focused on the good things I did but in group, I was able to see the bad things I did."* *"I know that I was distributing the tasks to everyone"* *"It did because you get to see what role you play in the group."*
Group feedback	23%	*"We discussed and gave marks according to our respective contribution that are fair."* *"you get to actually think more about the project."* *"we all discussed and give the marks to individual according to their contributions."*
unclear/no	9%	*"because it was positive"*

answer		

Almost all participants, 94%, agreed with the statement, and 68% of all participants obtained feedback about themselves. Self-feedback allowed for thinking outside the PE criteria. A weak senior female participant wrote "*I tended to evaluate myself just on the work stuff, where as my group members took it into account my responsibilities outside of work and gave me a better mark. They said I am too hard on myself*." A senior average male wrote the following: "*… I learned that not everyone has the same personalities and cultures, which can impact on the grading process*".

Approximately one quarter of respondents learned more about the group. Their feedback said the process allowed the members to talk about the project, and each other's contribution; it resulted sometimes in disagreements, but a fair evaluation.

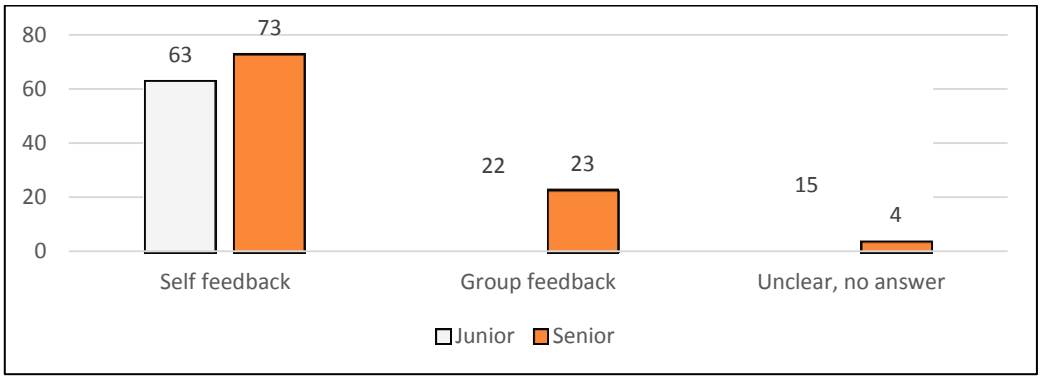

Figure 11
Participants' Justifications to the Questions "Did the Process Allow You to Reflect Back on Your Role and Contribution to the Group" According to Year of Study in Percentage of Responses

Just as the previous variable demonstrated, Figure 8 shows that junior and senior students learned more about themselves, in relatively same proportions. Therefore, years of study did not influence this question.

APPENDIX J
STATISTICS USED FOR BOX PLOT ANALYSIS FOR THE IMPACTS OF PEER EVALUATIONS ON INDIVIDUAL GRADE

STATISTICS USED IN BOX-PLOT ANALYSIS FOR IMPACTS OF PEER EVALUATIONS ON INDIVIDUAL GRADE

Table 31
Statistics for Female Participants' Grades of Through all Four Peer Evaluations

Quartiles	1st private PE	1st public PE	2nd private	2nd public PE
Min	59,45	41,00	73,32	60,00
Q1	72,58	70,68	78,48	78,85
Median	77,56	77,00	82,28	85,00
Q3	84,55	80,75	91,91	87,15
Max	100,13	87,22	96,90	96,90

Table 32
Statistics for Male Participants' Grades of Through all Four Peer Evaluations

Quartiles	1st private PE	1st public PE	2nd private	2nd public PE
Min	55,07	52,50	62,25	60,00
Q1	70,55	73,50	78,85	80,00
Median	79,00	80,00	82,13	85,00
Q3	85,49	87,15	88,53	87,15
Max	100,43	123,00	94,81	90,00

Table 33
Statistics for Weak in Academic Profile Participants' Grades of Through all Four Peer Evaluations

Quartiles	1st private PE	1st public PE	2nd private	2nd public PE
Min	59,45	41,00	62,25	60,00
Q1	70,33	70,97	78,19	81,44

Median	74,10	75,00	80,18	85,00
Q3	79,16	80,38	88,20	89,00
Max	90,20	123,00	95,20	96,90

Table 92
Statistics for Average in Academic Profile Participants' Grades of Through all Four Peer Evaluations

Quartiles	1st private PE	1st public PE	2nd private	2nd public PE
Min	68,40	41,00	62,50	60,00
Q1	76,38	72,76	75,73	77,25
Median	82,91	80,38	80,72	81,65
Q3	86,86	84,49	91,22	85,54
Max	100,43	123,00	94,81	89,25

Table 93
Statistics for Strong in Academic Profile Participants' Grades of Through all Four Peer Evaluations

Quartiles	1st private PE	1st public PE	2nd private	2nd public PE
Min	55,07	52,50	76,69	75,00
Q1	72,80	71,35	80,96	79,43
Median	79,69	83,60	87,38	85,00
Q3	87,79	85,08	90,16	87,14
Max	100,13	97,75	96,90	96,90

APPENDIX K
CORRELATION ANALYSIS

CORRELATION ANALYSIS

Correlation analysis explores the linear relationship between two variables. The independent variables studied were gender, academic profiles, and year of study. To conduct the analysis, each variable was converted in a numerical value: 1 for female and 2 for male; 1 for weak student, 2 for average students and 3 for strong student, and so on. Using Excel, various correlation analyses was conducted between the following exit survey questions

- Gender and exit survey questions 8 to 11
- Gender and self-assessments scores on private and public PEs
- Academic profiles and exit survey question 8 to 11
- Academic profiles and self-assessment score on private and public PEs
- Year of study and exit survey question 8 to 11
- Year of study and self-assessment scores on private and public PEs

Correlation scores below 0.19 are very low; between 0.2 and 0.39 it is low; between 0.4 and 0.59 the score is moderate; 0.6 and 0.79 are strong; and above 0.8 is very strong. A positive correlation means that when one variable increase, the correlated variable also increases. A negative correlation is opposite. All correlations scores obtained were very low to low. Therefore, they did not provide meaningful values to further understand the differences between the private and public PEs.

APPENDIX L
REGRESSION AND ANOVA ANALYSIS RESULTS FOR PEER EVALUATIONS

REGRESSION ANALYSIS STATISTICS FOR PEER EVALUATIONS

Regression Analysis Statistics for Entire Sample

Table 94
Regression Statistics for Self-Assessment Score vs. Scores for Private and Public Peer Evaluations for the Sample

	1st Round		2nd Round	
Regression Statistics	**Results for 1st Private PE**	**Results for 1st Public PE**	**Results for 2nd Private PE**	**Results for 2nd Public PE**
R Square	0,4027	0,2432	0,4789	0,0886
Adjusted R Square	0,3900	0,2271	0,4678	0,0692
Standard Error	0,1032	0,1161	0,1172	0,1550
Observations	49	49	49	49

Table 95
Anova Statistics for Self-Assessment Score vs. Private Peer Evaluation Scores for the Sample in the 1st Round of Peer Evaluations

Anova Statistics	**df**	**SS**	**MS**	**F**	**Significance F**
Regression	1	0,3376	0,3376	31,6974	9,7267
Residual	47	0,5005	0,0106		
Total	48	0,8382			

Table 96
Anova Statistics for Self-Assessment Score vs. Public Peer Evaluation Scores for the the Sample in the 1st Round of Peer Evaluations

Anova Statistics	**df**	**SS**	**MS**	**F**	**Significance F**
Regression	1	0,2038	0,2038	15,1075	0,0003
Residual	47	0,6343	0,0134		

Total	48	0,8382			

Table 97
Anova Statistics for Self-Assessment Score vs. Private Peer Evaluation Scores for the Sample in the 2nd Round of Peer Evaluations

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,5939	0,5939	43,2061	3,6349
Residual	47	0,6461	0,0137		
Total	48	1,2401			

Table 98
Anova Statistics for Self-Assessment Score vs. Public Peer Evaluation Scores for the Sample in 2nd Round of Peer Evaluations

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,5939	0,5939	43,2061	3,6349
Residual	47	0,6461	0,0137		
Total	48	1,2401			

Table 41
Regression Statistics for First Self-Assessment Score vs. Second Self-Assessment Score for the Sample

Regression Statistics	Results
Multiple R	0,0265
R Square	0,0007
Adjusted R Square	-0,0205
Standard Error	0,1335

Table 42
Anova Statistics for the First Self-Assessment Score vs. the Second Self-Assessment Score for the Sample

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0006	0,0006	0,0329	0,8567
Residual	47	0,8376	0,0178		
Total	48	0,8382			

Regression Analysis Statistics for Female Participants

Table 43

Regression Statistics for Self-Assessment Score vs. Scores in Private and Public Peer Evaluations for Female Participants

	1st Round		2nd Round	
Regression Statistics	Results for 1st Private PE	Results for 1st Public PE	Results for 2nd Private PE	Results for 2nd Public PE
R Square	0,3547	0,2470	0,6897	0,2807
Adjusted R Square	0,3253	0,2127	0,6756	0,2480
Standard Error	0,0789	0,1315	0,0438	0,0558
Observations	24	24	24	24

Table 44

Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Private Peer Evaluation in the First Round for Female Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0755	0,0755	12,0937	0,0021
Residual	22	0,1373	0,0062		
Total	23	0,2127			

Table 45

Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Public Peer Evaluation in the First Round for Female Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,1249	0,1249	7,2167	0,0135
Residual	22	0,3807	0,0173		
Total	23	0,5056			

Table 46
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Private Peer Evaluation in the Second Round for Female Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0941	0,0941	48,9119	0,0000
Residual	22	0,0423	0,0019		
Total	23	0,1364			

Table 47
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Public Peer Evaluation in the Second Round for Female Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0267	0,0267	8,5862	0,0077
Residual	22	0,0685	0,0031		
Total	23	0,0952			

Regression Analysis Statistics for Male Participants

Table 48
Regression Statistics for Self-Assessment Score vs. Scores in Private and Public Peer Evaluations for Male Participants

	1st Round		2nd Round	
Regression Statistics	Results for 1st Private PE	Results for 1st Public PE	Results for 2nd Private PE	Results for 2nd Public PE
R Square	0,4442	0,1788	0,1788	0,1406
Adjusted R Square	0,4189	0,1415	0,1415	0,1015
Standard Error	0,0724	0,1274	0,1274	0,0468
Observations	24	24	24	24

Table 49
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Private Peer Evaluation in the First Round for Male Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0922	0,0922	17,5797	0,0004
Residual	22	0,1154	0,0052		

Total	23	0,2077			

Table 50
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Public Peer Evaluation in the First Round for Male Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0778	0,0778	4,7898	0,0395
Residual	22	0,3573	0,0162		
Total	23	0,4351			

Table 51
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Private Peer Evaluation in the Second Round for Male Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0355	0,0355	9,1044	0,0063
Residual	22	0,0857	0,0039		
Total	23	0,1211			

Table 52
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Public Peer Evaluation in the Second Round for Male Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0079	0,0079	3,5991	0,0710
Residual	22	0,0482	0,0022		
Total	23	0,0561			

Regression Analysis Statistics for Weak in Academic Profile Participants

Table 53
Regression Statistics for Self-Assessment Score vs. Scores in Private and Public Peer Evaluations for Weak in Academic Profile Participants

	1st round		2nd round	
Regression Statistics	**Results for 1st Private PE**	**Results for 1st Public PE**	**Results for 2nd Private PE**	**Results for 2nd Public PE**
R Square	0,1985	0,1042	0,4646	0,1295
Adjusted R Square	0,1484	0,0482	0,4311	0,0751
Standard Error	0,0737	0,1227	0,0412	0,0511
Observations	18	18	18	18

Table 54
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Private Peer Evaluation in the First Round for Weak in Academic Profile Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0215	0,0215	3,9626	0,0639
Residual	16	0,0870	0,0054		
Total	17	0,1086			

Table 55
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Public Peer Evaluation in the First Round for Weak in Academic Profile Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0280	0,0280	1,8615	0,1913
Residual	16	0,2410	0,0151		
Total	17	0,2690			

Table 56
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Private Peer Evaluation in the Second Round for Weak in Academic Profile Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0236	0,0236	13,8819	0,0018
Residual	16	0,0271	0,0017		
Total	17	0,0507			

Table 57
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Public Peer Evaluation in the Second Round for Weak in Academic Profile Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0062	0,0062	2,3805	0,1424
Residual	16	0,0418	0,0026		
Total	17	0,0481			

Regression Analysis Statistics for Average in Academic Profile Participants

Table 58
Regression Statistics for Self-Assessment Score vs. Scores in Private and Public Peer Evaluations for Average in Academic Profile Participants

	1st round		2nd round	
Regression Statistics	Results for 1st Private PE	Results for 1st Public PE	Results for 2nd Private PE	Results for 2nd Public PE
R Square	0,3942	0,2498	0,4850	0,1071
Adjusted R Square	0,3807	0,2332	0,4736	0,0873
Standard Error	0,0757	0,1321	0,0539	0,0544
Observations	47	47	47	47

Table 59
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Private Peer Evaluation in the First Round for Average in Academic Profile Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,1680	0,1680	29,2831	0,0000
Residual	45	0,2582	0,0057		
Total	46	0,4262			

Table 60
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Public Peer Evaluation in the First Round for Average in Academic Profile Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,2614	0,2614	14,9862	0,0003

Residual	45	0,7848	0,0174		
Total	46	1,0461			

Table 61
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Private Peer Evaluation in the Second Round for Average in Academic Profile Participants

Anova Statistics	**df**	**SS**	**MS**	**F**	**Significance F**
Regression	1	0,1233	0,1233	42,3851	0,0000
Residual	45	0,1309	0,0029		
Total	46	0,2542			

Table 62
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Public Peer Evaluation in the Second Round for Average in Academic Profile Participants

Anova Statistics	**df**	**SS**	**MS**	**F**	**Significance F**
Regression	1	0,0160	0,0160	5,3989	0,0247
Residual	45	0,1331	0,0030		
Total	46	0,1491			

Regression Analysis Statistics for Strong in Academic Profile Participants

Table 63
Regression Statistics for Self-Assessment Score vs. Scores in Private and Public Peer Evaluations for Strong in Academic Profile Participants

	1st round		**2nd round**	
Regression statistics	**Results for 1st Private PE**	**Results for 1st Public PE**	**Results for 2nd Private PE**	**Results for 2nd Public PE**
R Square	0,3392	0,0221	0,1142	0,0458
Adjusted R Square	0,2841	-0,0594	0,0404	-0,0337
Standard Error	0,0815	0,1010	0,0587	0,0381
Observations	14	14	14	14

Table 64

Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Private Peer Evaluation in the First Round for Strong in Academic Profile Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0409	0,0409	6,1590	0,0289
Residual	12	0,0798	0,0066		
Total	13	0,1207			

Table 65

Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Public Peer Evaluation in the First Round for Strong in Academic Profile Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0028	0,0028	0,2709	0,6122
Residual	12	0,1225	0,0102		
Total	13	0,1252			

Table 66

Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Private Peer Evaluation in the Second Round for Strong in Academic Profile Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0053	0,0053	1,5478	0,2372
Residual	12	0,0413	0,0034		
Total	13	0,0466			

Table 67

Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Public Peer Evaluation in the Second Round for Strong in Academic Profile Participants

Anova Statistics	df	SS	MS	F	Significance F

Regression	1	0,0008	0,0008	0,5765	0,4624
Residual	12	0,0174	0,0015		
Total	13	0,0183			

Regression Analysis Statistics for Junior Participants

Table 68
Regression Statistics for Self-Assessment Score vs. Scores in Private and Public Peer Evaluations for Junior Participants

	1st round		2nd round	
Regression statistics	**Results for 1st Private PE**	**Results for 1st Public PE**	**Results for 2nd Private PE**	**Results for 2nd Public PE**
R Square	0,2846	0,2263	0,6499	0,2058
Adjusted R Square	0,2535	0,1926	0,6347	0,1713
Standard Error	0,0867	0,1718	0,0441	0,0672
Observations	25	25	25	25

Table 69
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Private Peer Evaluation in the First Round for Junior Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0689	0,0689	9,1514	0,0060
Residual	23	0,1730	0,0075		
Total	24	0,2419			

Table 70
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Public Peer Evaluation in the First Round for Junior Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1,0000	0,1986	0,1986	6,7258	0,0162
Residual	23,0000	0,6791	0,0295		
Total	24,0000	0,8777			

Table 71
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Private Peer Evaluation in the Second Round for Junior Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0832	0,0832	42,6934	0,0000
Residual	23	0,0448	0,0019		
Total	24	0,1280			

Table 72
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Public Peer Evaluation in the Second Round for Junior Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0269	0,0269	5,9611	0,0227
Residual	23	0,1037	0,0045		
Total	24	0,1306			

Regression Analysis Statistics for Senior Participants

Table 73
Regression Statistics for Self-Assessment Score vs. Scores in Private and Public Peer Evaluations for Senior Participants

	1st round		2nd round	
Regression Statistics	Results for 1st Private PE	Results for 1st Public PE	Results for 2nd Private PE	Results for 2nd Public PE
R Square	0,5496	0,3764	0,3770	0,2139
Adjusted R Square	0,5282	0,3467	0,3473	0,1765
Standard Error	0,0629	0,0718	0,0623	0,0281
Observations	23	23	23	23

Table 74
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Private Peer Evaluation in the First Round for Senior Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,1013	0,1013	25,6278	0,0001

Residual	21	0,0830	0,0040		
Total	22	0,1843			

Table 75
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Public Peer Evaluation in the First Round for Senior Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0653	0,0653	12,6757	0,0018
Residual	21	0,1082	0,0052		
Total	22	0,1735			

Table 76
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Private Peer Evaluation in the Second Round for Senior Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0493	0,0493	12,7077	0,0018
Residual	21	0,0815	0,0039		
Total	22	0,1308			

Table 77
Anova Statistics for Self-Assessment Score vs. Peer Evaluation Scores in Public Peer Evaluation in the Second Round for Senior Participants

Anova Statistics	df	SS	MS	F	Significance F
Regression	1	0,0045	0,0045	5,7155	0,0263
Residual	21	0,0165	0,0008		
Total	22	0,0210			

Regression Analysis Statistics for Self-Assessments 1 and 2

Table 78
Regression Statistics for the First Self-Assessment Score vs. the Second Self-Assessment According to Variable studied

Variable	R Square	R Square	Standard	Number

Studied		Adjusted	Deviation	
Sample	0.0885	0.0489	0.4876	49
Female	0.1267	0.0882	0.5170	25
Male	0.0019	-0.0415	0.4647	25
Weak in AP	0.0030	-0.0056	0.5271	19
Average in AP	0.0177	-0.0525	0.5580	16
Strong in AP	0.1964	0.1347	0.2401	15
Junior	0.0586	0.0194	0.4866	26
Senior	0.4121	0.3842	0.0706	23

APPENDIX M

ANALYSIS OF PARTICIPANTS' PREFERRED PEER EVALUATION ACCORDING TO VARIABLES STUDIED

PARTICIPANTS' PREFERRED PEER EVALUATION ACCORDING TO VARIABLES STUDIED

The following tables illustrate the detailed analysis for question 11 of the exit survey (participant's preferred peer evaluation).

Preferred of peer evaluation according to variables

Figure 12 shows the results according to genders in percentage.

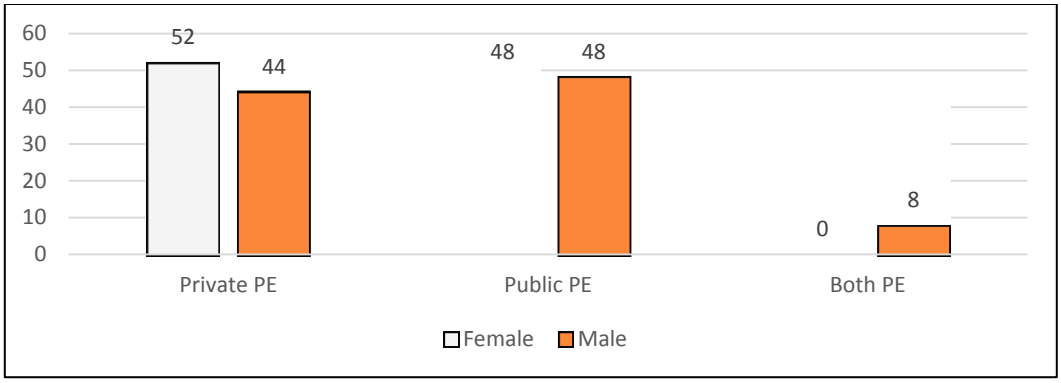

Figure 12
Participant's Preferred Peer Evaluation According to Gender

Once again, the distribution is almost equal between the genders. On the private PE side, eight percent more female participants preferred it as opposed to males. That represents two female participants. Two male participants did not have a specific preference and choose both PEs. Gender is not a major influential factor in the preferred PE.

Table 79
Participants' Preferred Peer Evaluation According According to Academic Profiles

Academic profiles	Private PE	Public PE	Both PE	Total
Weak students	10	8	1	19
Average students	5	10	1	16
Strong students	9	6	0	15
Total	24	24	2	50

Table 79 shows that twice as more average students preferred the public PE. The distribution among weak student is about half with 10 in favour of the private PE and eight in favour of the public PE. One third more strong students preferred the private PE, and there is minimal difference among the weak students. Academic profile influenced the PE preference.

Table 80
Participants' Preferred Peer Evaluation According According to Year of Study

Year of study	Private PE	Public PE	Both PE	Total
Junior students	14	10	2	26
Senior students	10	14	0	24
Total	24	24	2	50

Table 80 shows a minimal difference between juniors and seniors. Two junior male opted for both PE. Year of study has minimal influence on the PE choice.

Reasons for preferring the private peer evaluation according to the variables studied

Table 81
Categories and Distribution of Reasons for Preferring the Private Pee Evaluation

Categories	Distribution	Quotes representing the category
Honesty	59%	*"Because you have more freedom to say what you want."* *"I'm just comfortable keeping it confidential"* *"I was able to actually express what went on and what I believed the contribution should be"*
No influence from others	22%	*"Because I don't need the approval of others to put a grade"* *"Because can think more deeply and not be ashamed of what we think of others"*
Avoid conflict	15%	*"Because even if I can defend my point of view, I don't like confrontation and it creates tensions between classmates"* *"Because I do not like confrontation and I like to be honest about my opinion"* *"Because even if I can defend my point of view, I don't like to do so."*
Unpleasant to give negative feedback	4%	*"Because I could see that my other partners were not a their ease to critique the one who was so bad at group work"*
Total	100%	

Table 81 shows the distribution and sample quotes illustrating the category. The most popular reason is h*onesty* at 59% (Table 81). Participants enjoyed the freedom offered in this PE. Key codes included "*I can express", "freedom", and "honest"*. They can say what they think truthfully. They can express their reality about what happened in the group. There is a hidden belief that others will tint their perception or they cannot be honest in the public PE. It leads to the second most

common reason, with 22% of respondents opting for "*no influence from others"* (Table 23). Key codes included "*less pressure", "no influence from other", and "others 'approval"*. They relied on their sole experience. Participants appreciated the control they had over the evaluation process. They were not pressured or judged by others. Some participants viewed the private PE as "more reliable", as some participants wrote. Lastly, a small percentage, 4%, of participants believed providing feedback may be unpleasant. There is a significant concerned about how others feel when they receive feedback in person. This experience is believed to be unpleasant.

For 15% of respondents, they opted for the private PE because they recognised the potential conflict and disagreement, that expressing feedback openly may cause. The private PE is viewed as a way to avoid potential conflicts, tensions, and disagreements the public evaluation may cause. Key codes concentrated around disagreement, avoiding conflicts, and not contradicting.

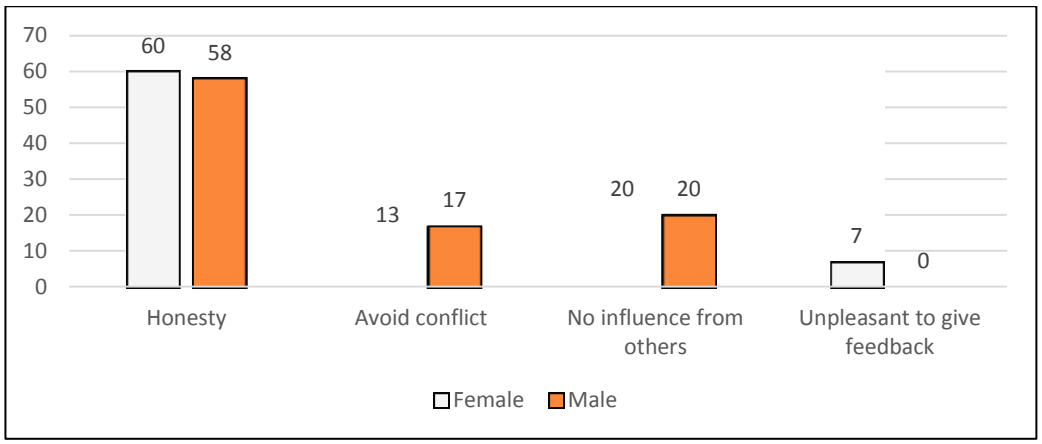

Figure 13
Participants' Reasons for Preferring the Private Peer Evaluation According to Genders Shown in Percentage of Responses

The reasons for preferring the private PE do not seem to be influenced by gender. In Figure 10, the results are relatively similar across, with the exception of *unpleasant to be negative feedback* that was the sole concern of seven percent of female participants.

Table 82
Participants' Reasons for Preferring the Private Peer Evaluation According to Academic Profiles in Percentage of Responses

Categories	Academic Profiles		
	Weak students	**Average students**	**Strong students**
Honesty	58%	80%	50%
No influence from others	25%	-	30%
Unpleasant to give negative feedback	-	20%	-
Avoid conflict	17%	-	20%
Total	100%	100%	100%

Eighty percent of students found shelter in the *honesty* aspects of the private PE, which is considerably more than the weak and strong students (Table 82). As well, the average students are the only ones opting for the private PE as a way to avoid feelings associated with giving negative feedback.

Table 83
Participants' Reasons for Preferring the Private PE According to Year of Study in Percentage of Responses

Year of study	Junior students	Senior students
Honesty	50	73
No influence from others	25	18
Unpleasant to give negative feedback	6	-
Avoid conflict	19	9
Total	100	100

Table 83 shows that *honesty* is the main reason especially for senior students. In smaller percentage, the other reasons for it were the lack of influence from others

at 18% and to avoid conflict at 9% (Table 83). In their three years of college studies, seniors most likely did not encounter a public PE. Therefore, the private PE may be a safer form of PE for them. Seniors mostly prefer the private PE for its benefit, i.e. *honesty* and *no influence from others*. They are not opting for it as a way to avoid a negative point such as conflict and the negative feeling rose when giving negative feedback. These last two points are found in the public PE. Overall, average junior female participants prefer this PE because it is unpleasant to give negative feedback

Reasons for preferring the public PE according to the variables studied

A total of 24 participants opted for the public PE. Some of the answers fitted in multiple categories, therefore the total is 27. The breakdown is 14 for female and 13 for male participants. Table 26 summaries the percentage of occurrences for each category. The categories are the same as the ones listed previously under question 7 (benefits and drawbacks of public PE). They are: *Agreement and maintaining peace*, *Fairness*, *improve team performance*, *peer feedback*, *opportunity to defend*, and *unclear/no answer.*

Table 84
Categories and Distribution of Reasons for Preferring the Public Peer Evaluation in Percentage of Responses

Categories	Distribution	Quotes representing the category
Fairness	37%	*"Because it is fair."* *"I preferred the peer evaluation completed in group. As, during the project and group work every one's contributions visible. That is why group evaluation is better to do in group too."*
Peer Feedback	33%	*"I have the feedback on my team how to improve and do better in the future"* *"because you get the opinion of the others in your group"*
Opportunity to defend	11%	*"Because you can justify yourself."* *"Because we have to get in agreement with our performance and it is much accurate compare to the other an also you can defend yourself."*
Improve team performance	8%	*"Because it strengthen the teamwork."*
Agreement and maintaining peace	7%	*"Because it was easier to discuss with one another and come to an agreement."*
Unclear/no answer	4%	*"I learned more, because I'm outside of the box when doing so. The individual does not allow me to find out more aside from what I know or think that I know."*
Total	100%	

Table 84 shows that approximately one third of participants prefer the public PE for it *fairness* and one third for providing *peer feedback*. The remaining third is spread among *opportunity to defend, improve team performance, and agreement/ maintaining peace.* In *fairness,* the participants believed the public PE lead to more

accurate results. They used words such as *fairness, accurate, and real.* The results are more fair because they are open to all; "*they are visible"* (senior weak female participant).

Although, peer feedback was the main selling point when introducing the public PE to the class, it was only the preferred reason of 33% of participants. They enjoyed hearing others' opinions. A strong junior male preferred it *"because it's always easier and more instructive in group."* Such answer demonstrated that some participants truly grasped one of the main objective of the public PE.

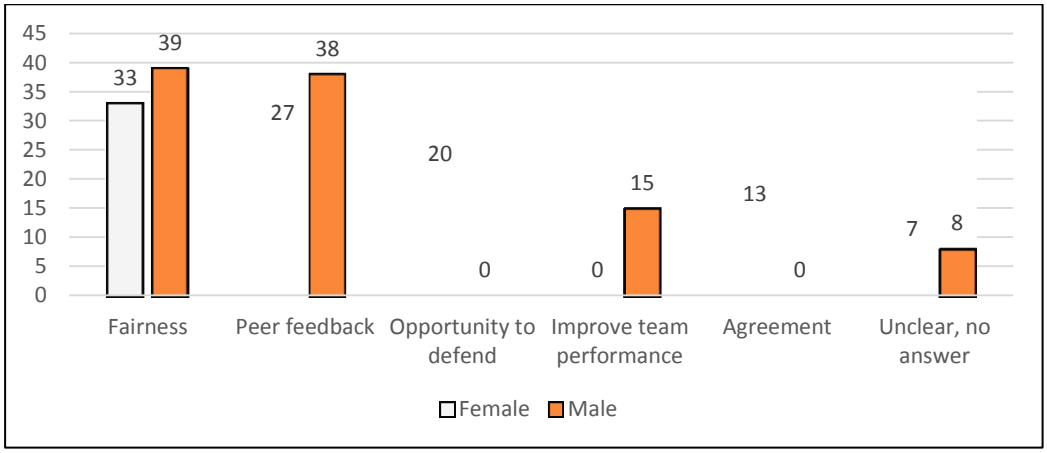

Figure 14
Participants' Reasons for Preferring the Public Peer Evaluation According to Genders in Percentage of Responses

Figure 14 shows some key absences in certain categories. *Opportunity to defend* is preferred by 20% of female participants, and zero male participants. *Agreement and maintaining peace* is also the preferred reason of 13% of female participants, while zero male participants identified it. Male are quite strong in *improving team performance* with 15%, while female participants are at zero. The strongest score for males are in *fairness* and *peer feedback.*

Table 85
Participants' Reasons for Preferring the Public Peer Evaluation According to Academic Profiles

Categories	Academic Prolife		
	Weak students	**Average students**	**Strong students**
Fairness	36%	22%	43%
Peer feedback	29%	34%	43%
Opportunity to defend	14%	11%	-
Improve team performance	-	11%	14%
Agreement and maintaining peace	14%	11%	-
Unclear/ no answer	7%	11%	-
Total	100%	100%	100%

Weak in APs students are not opting for the public PE to *improve team performance.* Eleven percent of average and 14% of strong students opted for this PE of this reason. *Fairness* ranks highest among strong students with 43% along with *peer feedback* with 43% also. Strong students are confident their work speaks for themselves and do not feel the need to take the opportunity to defend their work and contribution in the public PE. That is the concern of weak and average students.

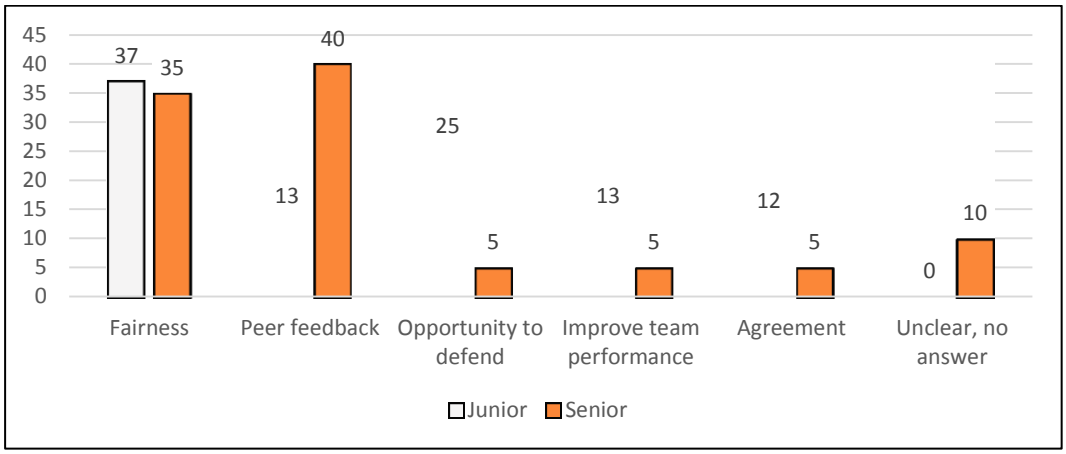

Figure 15
Participants' Reasons for Preferring the Public Peer Evaluation According to Year of Study in Percentage of Responses

Peer feedback is the preferred reason for 40% of senior students, followed by *fairness at 35%.* Once again, the exchange of feedback may be viewed as a way to reach more accurate and fair evaluations. *Opportunity to defend* is mainly chosen among junior students.

Reasons for preferring both peer evaluations:

Two male participants did not have a preference. On the questionnaire, they added a plus (+) sign between the two options. Their justifications are as follows: "I like both. I also think both should be always conducted." and "*they both need to be use together to get the most accurate peer evaluation*". The participants were in two different teams.

APPENDIX N
QUALITATIVE ANALYSIS RESULTS FROM PEER EVALUATION SCORE JUSTIFICATION

QUALITATIVE ANALYSIS RESULTS FROM PEER EVALUATION SCORE JUSTIFICATION

The following tables reflect the results from the justifying comments for all peers evaluations.

Table 86
Categories and Distribution of Participants' Justifications for the Private Peer Evaluations

Categories	Distribution for 1st Private PE	Distribution for 2nd Private PE
Attendances and punctuality	17%	9%
Meaningfulness of contribution	23%	25%
Meet deadlines	12%	11%
Quality of the work	21%	25%
Attitudes	21%	20%
Other comments	6%	10%
Total	100%	100%

Table 87
Categories and Distribution of Participants' Positive and Negative Justifications for the First Private Peer Evaluation in Percentage of Responses

Categories	Positive Comments	Negative Comments	Total for the Category
Attendances and punctuality	16%	1%	17%
Meaningfulness of contribution	22%	1%	23%
Meet deadlines	10%	2%	12%
Quality of the work	15%	6%	21%
Attitudes	18%	3%	21%
Other comments	6%	-	6%
Total	87%	13%	100%

Table 88
Categories and Distribution of Participants' Positive and Negative Justifications for the Second Private Peer Evaluation

Categories	Positive Comments	Negative Comments	Total for the Category
Attendances and punctuality	8%	1%	9%
Meaningfulness of contribution	23%	2%	25%
Meet deadlines	10%	1%	11%
Quality of the work	20%	5%	25%
Attitudes	18%	2%	20%
Other comments	10%	0%	10%
Total	89%	11%	100%

Table 89
Categories and Distribution of Participants' Justifications for the Public Peer Evaluations

Categories	Distribution for 1st Public PE	Distribution for 2nd Public PE
Attendances and punctuality	25%	6%
Meaningfulness of contribution	28%	20%
Meet deadlines	9%	16%
Quality of the work	20%	20%
Attitudes	13%	21%
Other comments	7%	17%
Total	100%	100%

Table 90
Categories and Distribution of Participants' Positive and Negative Justifications for the First Public Peer Evaluation

Categories	Positive Comments	Negative Comments	Total for the Category
Attendances and punctuality	18%	7%	25%
Meaningfulness of contribution	27%	1%	28%
Meet deadlines	9%	0%	9%
Quality of the work	16%	4%	20%
Attitudes	14%	0%	13%
Other comments	4%	0%	7%
Total	88%	12%	100%

Table 91
Categories and Distribution of Participants' Positive and Negative Justifications for the Second Public Peer Evaluation

Categories	Positive Comments	Negative Comments	Total for the Category
Attendances and punctuality	6%	0%	6%
Meaningfulness of contribution	17%	3%	20%
Meet deadlines	15%	1%	16%
Quality of the work	18%	2%	20%
Attitudes	20%	1%	21%
Other comments	17%	0%	17%
Total	93%	7%	100%

APPENDIX O
SELF-ASSESSMENT IN RELATION TO THEIR PEERS IN ALL PEER EVALUATIONS

SELF-ASSESSMENT IN RELATION TO THEIR PEERS IN ALL PEER EVALUATIONS

During the four PEs, students evaluated their individual contribution to the team using the same criteria; it is referred to as self-assessment. The following tables compare the self-assessment in relation to how their peers evaluated them in all PEs. To do so, each PE scores were entered in an Excel sheet for each student. For example, in a team of four, there were one self-assessment and three evaluation scores given by the team members. The numbers ranged between 50 and 150. These four PE scores were averaged and compared to the self-assessment. The same analysis was repeated for all four PEs. For easier manipulation of the data, the numbers were divided by 100. One of the following three scenarios occurred, when comparing the self-assessment with the average PE scores:

- *Self-assessment score is overvalued* - The individual wrote an individual score that is higher than the average PE score. The difference is positive and greater than 0.02. In this scenario, the individual believed their self-assessment was higher than what the group believed.
- *Self-assessment score is similar* – The self-assessment score is considered as similar when the difference between the self-assessment and the average PE scores is between the range of -0.02 and 0.02. This is the perfect scenario, where the peers and the individual viewed the individual as the same.
- *Self-assessment score is undervalued* – The individual wrote an individual score that is lower than the average PE score. The difference is negative and greater than 0.02. In this scenario, the individual believed their self-assessment was lower than what the group believed.

Results are expressed in number of occurrences in the tables below.

Table 92
Female Participants' Self-Assessment in Relation to their Peers in all Peer Evaluations

Female self-assessment in relation to peers	1st Private PE	1st Public PE	2nd Private PE	2nd Public PE
Overvalued	14	17	14	9
Similar	4	3	4	7
Undervalued	7	5	7	9
Total	25	25	25	25

In the first round of PEs, Table 92 shows that more than half of female participants overvalued their contribution in both PEs. When comparing the first and second private PEs, the numbers remained the same: 14 overvalued, four had similar scores, and seven undervalued their self-assessment. The public PEs did not change the private self-assessment of female participants throughout the process (Table 92).

However, when comparing the first and second public PEs, the number of female participants who overvalued their contribution decreased by almost half; those who undervalued themselves almost doubled, and the number of those who obtained similar score doubled in the second public PE (Table 92).

The process probably made them more critical of their performance and/or allowed female participants to best understand where they stand and how the groups see them. Or female participants made more compromises by the second public PE, even if their self-image is different in private PEs. Overall, females remained confident in their self-assessment as more than approximately two third of female overvalued or gave a similar score throughout all PEs.

Table 93
Male Participants' Self-Assessment in Relation to their Peers in all Peer Evaluations

Male self-assessment in relation to peers	1st Private PE	1st Public PE	2nd Private PE	2nd Public PE
Overvalued	14	13	11	6
Similar	6	6	8	15
Undervalued	5	6	6	4
Total	25	25	25	25

Table 93 shows approximately half of male participants overvalued their self-assessment in both private PEs and in the first public PE. The number of male participants who undervalued their self-assessment remained relatively the same throughout all PEs, with numbers ranging from four to six (Table 93).

A large number of males had the same self-assessment as their peers by the last public PE; 15 males out of 25 obtained similar score. That is double the number of female participants who obtained the similar self-assessment on the second public PE (Table 92).

Although the various PEs provided feedback to the individual, by the second round of PEs, the results of the second private and public PEs differed from one another and followed the same trend as female participants. Relatively the same number of males undervalued their self-assessment in the second round; doubled the male obtained a similar self-assessment in the second public PE; and almost double the number of male overvalued their self-assessment in the second private PE (Table 93). Overall, males remained more confident than females in their self-assessment as more than three quarter of male overvalued or gave a similar score throughout all PEs.

Table 94
Weak Students' Self-Assessment in Relation to their Peers in all Peer Evaluations

Weak students in relation to peers	1st Private PE	1st Public PE	2nd Private PE	2nd Public PE
Weak students overvalue	9	8	6	2
Weak student similar	4	4	6	8
Weak students undervalue	6	5	7	9
Total	19	19	19	19

Table 94 shows a little less than half of the weak students overvalued their contribution in the first round of PEs. By the second public PE, the number decreased to two. The number of weak students who obtained similar self-assessment increased in the second round of PEs, and doubled in the second public PE from four to eight (Table 94). However, the number of weak students who undervalued their contribution also increased in the second round of PE, and also almost doubled from five in the first public PE to nine in the second public PE. Overall, a greater number weak of students somewhat lost confidence in their self-assessment throughout the four PEs, as the number of student who undervalued themselves increased.

Table 95
Average Students' Self-Assessment in Relation to their Peers in all Peer Evaluations

Averages students in relation to peers	1st Private PE	1st Public PE	2nd Private PE	2nd Public PE
Average students overvalue	10	11	10	6
Average students similar	3	4	3	7
Average students undervalue	3	1	3	3
Total	16	16	16	16

Table 95 shows that average students tended to overvalue their contribution on all PEs. Only three average students undervalued their self-assessment on most PEs, and that number remained the same relatively throughout all PEs. Approximately 13 students out of 16 overvalued or obtained similar self-assessment

throughout all PEs. Therefore, a large portion of average students remained more confident than weak students in their self-assessment.

Table 96
Strong Students' Self-Assessment in Relation to their Peers in all Peer Evaluations

Strong students in relation to peers	1st Private PE	1st Public PE	2nd Private PE	2nd Public PE
Strong students overvalue	9	11	9	7
Strong students has similar	3	1	3	7
Strong students undervalue	3	3	3	1
Total	15	15	15	15

Table 96 shows that most strong students overvalued their contribution through all PEs. The numbers and patterns are relatively the same as the average students (Table 95). Once again, strong students remain confident in their contribution as more than 12 participants over 15 had a self-assessment that is overvalued or similar to their peers. Overall, academic profiles somewhat influenced the self-assessment score of participants, especially for weaker students.

Table 97
Junior Students' Self-Assessment in Relation to Peer Evaluations

Year of study in relation to peers	1st Private PE	1st Public PE	2nd Private PE	2nd Public PE
Junior students overvalue	14	16	14	9
Junior students similar	7	4	8	13
Junior students undervalue	5	6	4	4
Total in numbers	26	26	26	26

Table 97 shows that more than half of junior participants overvalued their contribution in the first three PEs. This number drops to nine in the last public PE. The number of junior students who obtained a similar assessment increased from the first to the second round of PEs. By the second public PE, the number tripled from 4 for the firs public PE to 13 students (Table 97). As well, the number of students who

undervalued their contribution remained relatively the same throughout the process (Table 97). Overall, a large portion of junior students remained confident in their self-assessment as more than 20 junior students out of 26 overvalued or obtained similar self-assessment throughout all PEs.

Table 98
Senior Students' Self-Assessment in Relation to Peer Evaluations

Year of study in relation to peers	1st Private PE	1st Public PE	2nd Private PE	2nd Public PE
Senior students overvalue	14	14	12	6
Senior students similar	3	5	3	9
Senior students undervalue	7	5	9	9
Total in numbers	24	24	24	24

Table 98 shows that more than half of senior students overvalued that self-assessment in the first three PEs, and this number decreased on the last public PE. Those who obtained a self-assessment score similar to their peers, remained low in the first three PEs but tripled in the last public PE to nine (Table 98). The number of students who undervalued their contribution is higher than junior students, and increased slightly in the second round of PEs (Table 98). Overall, a large portion of senior students remained confident in their self-assessment, however the numbers decreased slightly in the second round.

APPENDIX P
OTHER COMMENTS FROM THE EXIT SURVEY

OTHER COMMENTS FROM THE EXIT SURVEY

At the end of the exit survey, participants had a chance to write additional comments regarding the study. Forty-two participants had no additional comments and the remaining eight wrote comments regarding their experience in the study. They were generally positive. Although one participant found the process complicated. See Appendix P for the list of comments.

Here are the positive comments:

- *« Overall, doing both evaluations methods are good because they help to obtain better and more accurate results.* » (senior male weak in AP participant).
- *« Overall, I did enjoy the peer evaluations.* » (senior female average in AP student).
- « *I really enjoyed working with my group. We really achieved synergy in my opinion*. » (senior female strong in AP participant).
- « *This is a good experience for me. I never had to evaluate in a group.* » (senior female weak in AP participant).
- « *Peer evaluation completed in a group should always be done after the individual one so that you have time to reflect.* » (senior female weak in AP participant).

Comment regarding the process:

- "*Could be a little less complicated*" (junior female weak in AP participant).

Key take away comments:

- « *I learned that there is no mercy with grading; one must protect himself and prove it in order to avoid opposition!* » (senior female strong in AP participant).

- « *At the same time, we can tell in a group peer evaluation to the person who is not working to change their habits*. » (junior female weak in AP participant).